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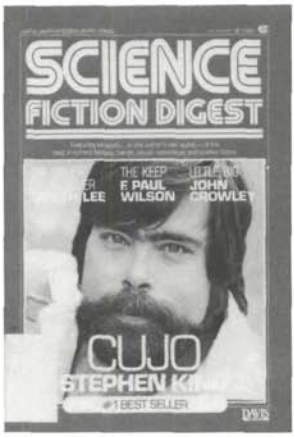

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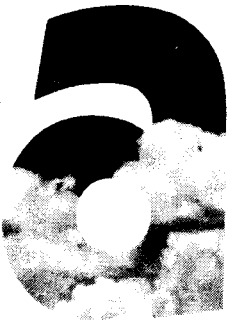

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Editorial

SPECIFICATIONS FOR SUPERMAN

Stanley Schmidt

When I had a science fiction class, one of my favorite teaching methods was the very old one of throwing out a question and letting the class try to find possible answers to it. Science fiction being what it is, virtually any subject was fair game. One that never failed to be fun was this: "If you could be granted *one* power, ability, or characteristic beyond those common to normal human beings, what would you choose?"

Superman, as in the comic strips and films of the same name, was not so limited. It's not quite fair to say, "You name it, he could do it," but it can hardly be denied that he had such a convenient assortment of superpowers, many of them with so little apparent basis, that he's a trifle hard to take very seriously on anything but a comic-book level.

But the concept of a superman (or superperson), with a small *s*, has played a prominent role in a great deal of serious science fiction. Usually these superpersons have had to settle for more modest arrays of talents. Some have been the products of events which led to general superiority, with more or less across-the-board enhancement of normal physical and/or mental abilities; but many have had to settle for *one* conspicuous advantage. That might be supernormal strength, intelligence, or control of a normal nervous system. Or it might be a genuinely *new* development such as some form of extrasensory perception, or the remarkable "extra brain" of Gilbert Gosseyn in A.E. van Vogt's *Null-A* books, or the higher-level organization of the *Gestalt* organism in Theodore Sturgeon's *More Than Human*. Always, though, the superhuman abilities have had well-defined limits, and those have largely shaped the course of the story. (When Timothy Zahn, a prolific contributor to *Analog* during the last couple of years, was starting out, he seemed to be specializing in "marginal supermen" with *very* limited abilities.)

Much of the fiction about supermen, of course, has looked considerably beyond the question of the possible *nature*

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of supermen (possibly, as I shall later suggest, to the extent that it has unduly limited its consideration of that question). It has considered such questions as how could a superperson come to be? Would such a person, or a breeding group of them, be a threat to "normal" mankind? How could the threat be combatted? *Should* the threat be combatted—or should superhumanity be actively sought and encouraged? Fictional sympathies have fallen on several sides of the fence.

Superhumanity, as a fictional theme, seems to have fallen into relative disfavor in recent years. No doubt this can be attributed in part to the fact that the concept was so overworked in the past that people grew somewhat tired of it—and writers found it increasingly hard to think of significantly new variations on it. The waning of the superman concept in fiction may also have something to do with the recent fad for pretending that all persons are equal in all ways and will always remain so.

However, it seems to me that as subjects for thought (and fiction), the possible nature, origin, and effects of superhumanity are at least as pertinent now as they have ever been—and in some ways, at least, perhaps more so. It's not clear that *Homo sapiens* is presently undergoing much evolution—in fact, there are reasons to suspect that if we are evolving at all, the tendency may be toward *less* fit rather than more fit forms, since civilization protects many individuals with conditions which would not allow them to survive in a "wild" state. However, it's rather easy to imagine a sudden change in conditions which would put natural selection back to work with a vengeance. Either a war or a cometary impact, for example, might disrupt conditions enough to cause the collapse of civilization on Earth; a large-scale climate change could do the same more slowly. Either way, something beyond ourselves might evolve right here. Or we may meet extraterrestrial beings with superhuman abilities, either by going into space ourselves or by being here when they stop by. And it is quite likely that we will soon have the ability to *create* new abilities, on a very short time scale, through genetic engineering. Whether it is desirable to do so or not is another question entirely, and not particularly relevant to the one I'm considering here. Even if you and I can agree that it shouldn't be done (and I'm not expressing an opinion!), it's virtually certain that if the capability exists, somebody, somewhere, will sooner or later use it. Even nonparticipants would be well advised to think about the possibilities, if only to know what they may be up against.

At the very least, the question with which I opened remains a good intellectual exercise (and source of new stories). Sure, a lot of answers have already been considered—but I seriously doubt that *all* possibilities have been exhausted. It may well be that in concentrating on the possible *consequences* of superhumanity, fiction has not explored as thoroughly as it might the question of what *forms* superhumanity might take.

And different forms will have different consequences.

Please note that for purposes of the "game," I've deliberately phrased the

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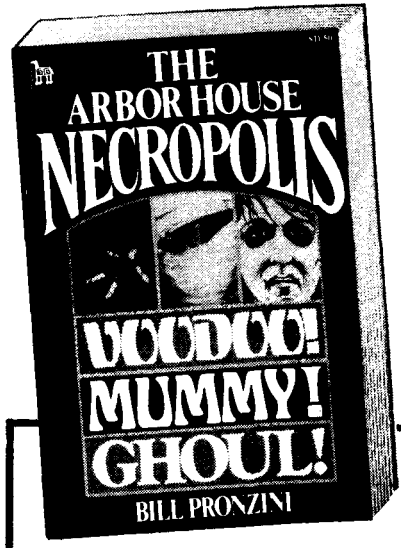

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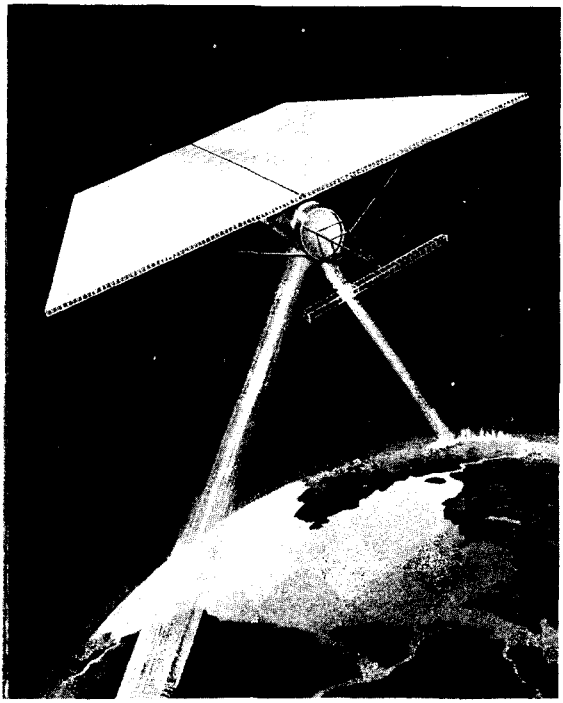

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question *very* broadly. A "power, ability, or characteristic" doesn't have to be something simple and obvious like strong arms, flight, increased intelligence, or "x-ray vision." (Yes, I'm willing to consider even that—the question of *how* the desired ability is to be achieved is, for present purposes, to be treated as an engineering problem, and we'll tentatively assume that the necessary equipment—even a built-in x-ray source—can somehow be provided.) The question I'm posing is limited to *defining* a new characteristic or ability, without imposing any *a priori* restrictions on how it's to be achieved.

Let me just throw out two examples, in closing, to illustrate the kinds of possibilities I'm thinking of. The first is rather far-out, an extreme case of an answer conceived with very few restrictions—an ability so comprehensive that you might dismiss it as cheating by playing with words. I'll freely admit that I doubt that it could ever be fully achieved in reality. Nevertheless, it's an interesting target to shoot for, and even a very imperfect approximation to it would give its owner a *big* advantage. It is this: Granted the wish of one exotic ability, I'd like to be a "facultative everything." If that term doesn't tell you much, let me remind you that a "facultative anaerobe" is an organism which can use oxygen in its metabolism, if it's available, but can get along without it if it isn't. "Facultative," in this context, means able to take something or leave it. Actually, in the case of the facultative anaerobe, it means a little more than that—it means able to derive special benefit from something (oxygen), without being dependent on it for survival. The facultative anaerobe is thereby more versatile (and less vulnerable) than *either* an aerobe or an anaerobe of the "obligate" type—that is, an organism which either *must* have oxygen or is fatally poisoned by it. Being *either* dependent on or vulnerable to *anything* will be a weakness under some circumstances. Therefore, given

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a truly talented Fairy Godfather to grant my wishes, I would choose to be able to approach anything—oxygen, money, hamburgers, fame, fresh water, air conditioning, airlines, civilization, or anything else—as the facultative anaerobe approaches oxygen: making good use of it when I can get it, and getting along without it when I cannot. Sometimes this would be a physical ability, sometimes mental. Usually, I suspect, it would be both—and always it would be useful.

My other answer is much more restrained, more specific, and probably more realistic. "Increased intelligence" is an awfully vague term, considering that intelligence seems to be compounded of many separate elements and we're just beginning to learn what they are. Let me pick just one, fairly concrete: *improved information retrieval.* Psychological studies suggest that virtually every piece of data you have ever taken in is stored *somewhere* in your brain—but there are relatively few that you can locate and extract at will. People with "good memories" don't really have better memories (i.e., storage), just better *access* to their memories—but even they are usually pretty limited. For example, suppose you drive from Cleveland to Miami and I later ask you how many red barns you passed on the way. Chances are you couldn't tell me (unless you have an unusual fixation on red barns)—but if those psychologists are right, you have stored mental images of *all* the barns you passed, red or otherwise. You just don't know how to get them out, or to abstract that single datum about how many there were, unless the information is requested in certain specific forms. A person with a "photographic" (more properly, eidetic) memory might be able to call up those images, literally "replaying" his entire visual memory of the trip, and *count* the red barns after the fact. But that's a cumbersome process at best, and most of us can't even do that. Therefore I suggest that a person granted the choice of one "superhuman" ability might gain a great deal by simply being able to access the memories he already has in more ways and more efficiently than humans presently can.

Okay—there are two answers, each at least a little offbeat, to the question I posed at the beginning.

What would *you* pick? ■

● Experience should teach us to be most on our guard to protect liberty when the government's purposes are beneficial. Men born to freedom are naturally alert to repel invasion of their liberty by evil-minded rulers. The greater dangers to liberty lurk in insidious encroachment by men of zeal, well-meaning but without understanding.

Justice
Louis Brandeis

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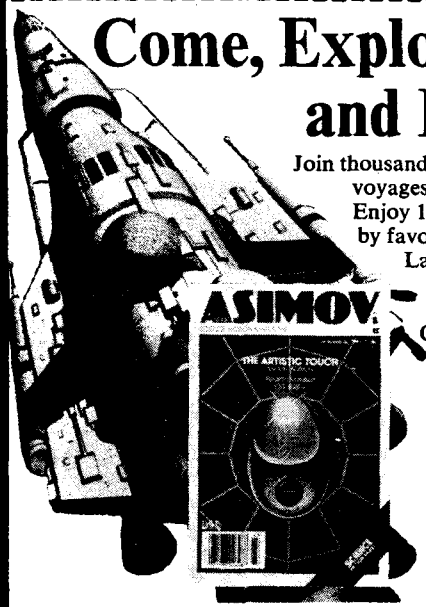

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Part One

Donald Kingsbury

COURTSHIP RITE

Human cultures, like individuals and species, must adapt to their environments. Ways of life that work in one place may be quite inappropriate somewhere else.

1

In the deserts of the Swollen Tongue below the Wailing Mountains there lives an insect species which organizes other insects by mimicking their olfactory communication systems. The sense and control organs of the eight-legged kaiel are contained in an intricate design on their backs called hontokae. Priests of the human clan named Kaiel copy a stylized version of the hontokae into their skins so all will know that they intend to command all.

Harar ram-Ivieth
from his "Following God"

Prime Predictor Tae ram-Kaiel was long dead but he lived in the bellies of his aggressive progeny. Even the youngest of them had shared his flesh at a Funeral Feast still remembered in clan chant around the rowdy gaming tables of the Kaiel temples.

An old man, Tae had been skinned and then marinated and stuffed with insect-flavored bread before his body was spit-roasted. In the evening of the first high day of the week called Skull in the year of the Mantis, when the coals of

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the spit fire were as dull as Getasun caught by a sandstorm, he was carved to the monotonous voice of chanting and served in a spiced sauce that had been salted by a spoonful of blood from each of his 83 sons and 70 daughters.

The three brothers Gaet, Hoemei, and Joesai had been among the sons of Tae ran-Kaiel who celebrated his Funeral. Boys then, wild comrades, they had felt more than comradery, around the dull glow of the spit fire as the chanter, naked in the etched designs of his skin, carved up their father and sang the song of the Silent God of the Sky who waited for men strong enough to unify Geta.

That night they had been moved to take the vow of husbands, though they were only boys and knew no women they could share as wives. The drunken crowds, the drifting smoke mixed with incense, the emerging skeleton of the Prime Predictor fevered their souls. The three vowed to be husbands in a team that would bring honor to the Kaiel by carrying out the wishes of their father.

Since the Getan ideal was a balanced team, they decided that Hoemei should partake of his brains, Gaet should partake of his heart, and Joesai of his thighs. Thus they sealed their marriage as gleam-bright God passed overhead in the purpled sky.

"As God is my witness," said Gaet, making the sign of loyalty.

"As God is my witness," said Hoemei, his eyes on God.

"As God is my witness," said Joesai, watching God pass among the stars.

"Do you think we could get a crack at the whisky barrel?" mused Gaet. Men's vows were oiled by drink.

"It is forbidden," said Hoemei, meaning they were children.

"Wait till Aesoe makes his acceptance speech." Joesai was grinning.

Some called Aesoe "the Shadow" because of his continuous proximity to Tae. Now he was sitting on a whisky barrel, laughing with friends. He would be the new Prime Predictor, not because he was Tae's favorite, but because the predictions he had left in the Archives had proved more accurate than those of any other Kaiel.

Aesoe moved onto the stage. Even in those days he had loved to grip his audience with his booming oratory and waving arms. Joesai watched him, sometimes listening, sometimes sneaking toward the barrel.

"Since the epoch when God chose His Silence, priests have been isolating themselves from their people, and having lost contact, have been decimated when the underclans rebelled. New priest clans are legislated and are themselves overthrown. It was Tae who first analyzed the true nature of this falling."

Joesai stole an empty mug from a rapt listener who stood smiling at the thousandth retelling of the reason Tae had laid down his law of Voting Weight. Their new clan leader waited serenely, savoring the hush his words created before breaking it. "Tae has decreed the rules by which we live and by which we have become strong. Are we strong?"

"All power to the Kaiel!" the crowd roared in the deep voices of men and the higher voices of women and the enthusiastic voices of children.

Joesai sipped the last drop of whisky in the mug, then pretended he was paying attention to the stage. Aesoe blazed

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now like Getasun in storm. "One: A Kaiel is to be allowed voting rights in the councils only in proportion to the size of his personal constituency."

"All power to the Kaiel!" roared the massed clan in ritual.

"Two: The constituency of any Kaiel may consist only of loyal friends."

"All power to the Kaiel!" Joesai was near the whisky now, and planning his tactics.

"Three: No Kaiel may belong to the constituency of another Kaiel."

"All power to the Kaiel!" If he could nudge it, the spigot would drip.

"Four: No non-Kaiel may belong to more than one constituency."

"All power to the Kaiel!"

"Five: No one of the underclans shall be forced into a constituency by either fear or place of domicile."

"All power to the Kaiel!" The mug was on the ground, filling up drip by drip. Joesai stood nearby, innocently.

"Six: The councils may challenge any Kaiel at any time to recite the names of the pledged members of his constituency and to describe in detail the concerns of each. Any person he cannot remember is stricken from his list."

"All power to the Kaiel!"

Aesoe gestured a pause. In one bound he was off the stage and whacking Joesai viciously across the mouth. He tipped over the mug, and shut off the dripping spigot. Then he climbed back to the stage, grinning while the commotion died down.

"Seven: A Kaiel who can summon no friends from the underclans remains voteless in the councils and is required to remain childless or leave the clan."

His audience was back in the mood, Joesai forgotten. "All power to the Kaiel!"

"Your mouth is bleeding," whispered Gaet.

"It is the soup pot for you," whispered a frightened Hoemei.

Joesai only smiled with blood-stained teeth and produced a small wooden flask, half filled.

Gaet sniffed the heavy alcoholic fumes and shoved the flask under his coat.

"You stole it?" worried Hoemei.

"Couldn't resist," grinned Joesai.

That mischievous night had been long ago. They had left the creche, they had married twice, they had made money and achieved a small fame. Though less brilliant than Hoemei, who was favored by the high councils, and less terrible than Joesai, who was favored by the Order of Hontokae, Gaet became the most powerful of the brothers in the lower councils with a voting weight of forty-three. He was the most suave, the most travelled, the subtle charmer of ladies; he smiled more than his mates and instantly befriended any human who served him.

Now, fresh from an encounter with the aging Aesoe, Gaet felt surly, a scowl deepening the scars of his decorated face.

The maran mansion, bought by the three brothers with their first fortune, was on the slope of a hill overlooking the Palace. Still only half built, the Kaiel Palace lay against the sky, a group of pink ovoids plumper than they were tall, as if stream-smoothed pebbles had been balanced on and around each other. The Palace glowed like molten iron at dawn while the huge furnace-colored disk of Getasun rose to the east of it.

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Gaet ignored it all, ignored his neighbors' villas. Furious, he even neglected to say hello to a passing Ivieth porter. He pushed through his gate, strode across the courtyard of his home and around the fountain pool, while his surprised two-wife Teenae scampered to follow him.

"Troubles on your soul! Give me troubles!"

"Where's Hoemei?"

"At the Palace. Joesai is home."

"And one-wife?"

"Noe sleeps. What is it?"

"Aesoe has forbidden us to marry Kathein."

Teenae stopped in shock, then turned away. "I will wake and bring Noe!" She bypassed the stairs and leaped for a pole which extended from the courtyard wall, flipping herself up over the railing out of sight.

Gaet seated himself by the pool, having foreknowledge that one-wife would make him wait. Noe was not a woman to be hurried. He thought blackly of the orders Aesoe had given him, which were in direct conflict with his own plans. Images of a marriage feast passed before his eyes, the Call of the Bonds, the giving of the Five Gifts.

It did not suit him to relinquish Kathein in favor of a woman he did not know. It did not suit him, this idea of setting up residence along the coast. It did not suit him to leave the ever-fascinating struggles of the city of Kaielhontokae while he was still forging his family's Place.

Should he obey Aesoe and go to the coast to meet this heretical stranger and charm her and bring her home merely to gain the favor of Aesoe's Expansionists? Or should he send Joesai to kill her?

2

The God of the Sky gave us a harsh land because we are a rebellious Race. We wandered across the Swollen Tongue and He watched us. Ten thousand died in the snow of the Wailing Mountains and He did not speak to us. We planted our crops by the Njarae Sea and He ignored us. West and east and south and

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north, deep were the graves carved into the merciless stone. Here are their names: the Graves of Grief, and the Graves of the Wailing Mountains, and the Graves of the Blind Eye, and the Graves of the Losers.

Prime Predictor Njai ben-Kaiel
from her "Third Speech"

Hoemei wandered into the Palace maze within the main ovoid, distracted for a moment by the uncommon electric glow that still amazed even him who knew its magic, and knew how it was fabricated in the basement workshops of Kaiel-hontokae. Aesoe saw an electrified Geta. That was foolishness. There was no end to the things Aesoe saw. These wild visions were afflicting even Hoemei's dreams.

He paused at the entrance to Aesoe's lair, removing his shoes. When Aesoe did not notice him at the high doorway, he walked forward and seated himself upon the pillows, then looked straight at the Prime Predictor, waiting. Nothing would have induced Hoemei to interrupt the overpriest of the Kaiel clan. Old Aesoe sipped a drink, speaking to his scribe and to the wrinkled o'Tghalie who served as his personal computer. He sipped again, brought out a map and put away some papers.

"I have already spoken to your brother Gaet."

"One-brother has not yet seen me, sire."

Aesoe shrugged. "You know your family has been given the Valley of Ten Thousand Graves down to the sea."

"Being the central route to the sea through the Wailing Mountains it will add to our wealth, but also to our burdens. Many have refused this gift."

". . . and will not rise to power within the Kaiel."

"Which is why we accepted the gift, though it is not the Kaiel's land to give."

Aesoe snorted at such pious morality. "Do you know why this valley exists as an unconquered sliver in our side?"

"All Kaiel who settle there are murdered."

"Have you speculated upon the nature of the murderers?"

"I deal in facts," said Hoemei.

"Ah, but we who make policy can lose the game if we wait for facts. Speculate!"

"My guess would be the Mnankrei."

"Why not the Stgal? The Stgal would have more to lose. It is their land."

"The Stgal are cowards. They fear us. The Mnankrei covet the lands of the Stgal as we do. These sea priests have been known to advocate violence and their Storm Masters range up and down the Njarae unhindered in their billowing ships."

Aesoe cleared his throat. "Our spies tell us that a village called Sorrow was the scene of the murders." He pointed out Sorrow on the map, a small harbor of the Njarae Sea. "The Stgal have a great temple there. It is also a center of heresy. The heretics tolerate their Stgal, finding priestly weakness useful. The Stgal tolerate the heretics because they oppose us and oppose the Mnankrei."

"It must be a new deviation."

"Very new. But its basis has been latent in the region for some time. Priestly weakness generates heresy."

"The heretics were the murderers?"

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"Who will ever know? Perhaps. My spies tell me they are fearless. But so are the Mnankrei. And I would not turn my back on a man who smiles at me as the Stgal do."

"You are telling me that we must stab with a three-pronged fork: destroy the heretics, destroy the Mnankrei, and destroy the Stgal."

"Not at all. Your father Tae was a man of great wisdom. We conquer by making friends, not by destroying. If you are feared, you must fear. You maran-Kaiel were chosen for this mission because Gaet has a certain way with people and he never makes an enemy. He forgets, though. Out of sight, out of mind. You're the administrator, the one who remembers to provide continuity."

"Gaet never makes an enemy because he doesn't have to. He uses Joesai for all of his dirty work."

"True. The making of friends often requires an open smile and a covert hand."

"So the treacherous Stgal teach us," said Hoemei ironically. "But how do you make friends with a heretic who rejects all your values?"

Aesoe sipped from his goblet and laughed the great laugh so enjoyed by the Getan population. "Heretics are never as different as they seem. They are like genetic mutants. A mutant shares most of your genes. A heretic shares most of your ideas. Most mutations manufacture the wrong proteins. Most heresies are false. But then—we Kaiel are heretics." And he laughed again.

"And how do you make friends with the Mnankrei and the Stgal?"

"Is that necessary when it is the heretics who control the hearts of the people?"

Hoemei became pensive. "You are instructing us to weave together the common goals of Kaiel and heretic as the way to take over the Valley of Ten Thousand Graves?"

Aesoe laughed. "My instructions are much simpler. You are to marry their women. Your family, for instance, is missing a three-wife."

"We court Kathein pnota-Kaiel," said Hoemei warily.

"No longer. I have given the orders. I have the votes. You are to marry Oelita the Clanless One who has singlehandedly created this heresy."

"And *she* knows of this?" asked Hoemei, his voice delaying while his thoughts raced.

"Of course not."

"We are to take a Kaiel-killing heretic to our pillows?"

"It is to be so."

"I don't like it."

Aesoe flared at this rebellion. "I have thirty families such as yours to deal with this week. Your personal problems are petty. *I* see the whole. I do what I must do for the clan. Without the clan you are destroyed. Therefore you will do what you must do. Some other day I'll argue."

Hoemei felt his love for Kathein like a stab of warm pain passing down his spine. He thought of a time once spent with her in the garden, her black hair in his lap, while he chattered as if she had suddenly drilled an artesian well into his depths with her gentle questions. *Ah, how loss makes us feel our love*. He stared at Aesoe, careful not to

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speak, for tears would have been an improper response to this order.

3

The Gathering of Ache marched into the Wailing Mountains to meet the challenge of the Arant. The Arant heresy proclaimed that the Race was created by machines in the caves of the Wailing Mountains. Arrogantly they stated that the God of the Sky was merely an inner moon—but they died by Judgment Feast while the God of the Sky orbited over the land He had found for the Race. And the Gathering created the Kaiel to guard the Wailing Mountains from falsehood.

The Clei scribe Saneef in
"Memories of a Gathering"

Noe, one-wife of Gaet and Hoemei and Joesai, came out on the stone balcony of the inner courtyard only after dressing. Teenae hurried up beside her, a full head shorter than her co-wife, to stare anxiously at Gaet with huge eyes that glowed beneath dark eyebrows.

Bathing his feet in the atrium's pool, Gaet looked up. Such beauty allowed him to dismiss his anger for a moment: Noe with her hair carefully braided into a helmet of excellence, Teenae with her hair shaved down the middle and flowing like liquid night upon her shoulders, Noe in a soft drape, Teenae in casual trousers stitched together out of hundreds of saloptera bellies and hung from a wide belt of the cured hide of her favorite grandfather, her breasts carved in the mathematical spirals that the o'Tghalie often sported.

Gaet was proud that *he* had found these worthy wives. Noe was a Kaiel—her mother the organizer of trading fleets on the Njarae Sea that tested the might of the Mnankrei, her father architect of the Kaiel Palace. Teenae he had bought from the o'Tghalie clan when she was still breastless and pliable. He smiled.

"Peace fights with your anger," said Teenae, watching Gaet, "and your anger laughs." Her voice was gentle.

"How can my dark gloom survive the rising of Stgi and Toe?" The two brightest stars in the Getan sky belonged to the mythology of love and Gaet often used their names affectionately in reference to his two wives.

Joesai came to the balcony, towering beside his wives, his body scarred in intricate designs of unorthodox curve whose meaning lay outside of the conventional symbology. "Ho. What is it?"

"Aesoe has denied us Kathein as three-wife!"

"Cause for anger! What compensation does Aesoe offer?"

"Little. He orders us to wed a coastal barbarian."

"There are no Kaiel on the coast."

"True."

"What clan is she?"

"She is clanless."

"Aesoe has gall! And why should her genes host in Kaiel bodies?"

"He vouches for her kalothi," said Gaet.

"There are many ways of surviving! There are many kalothies! *Our* way of surviving is to organize. Answer my question: Why should *her* genes be allowed to host in *Kaiel* bodies?" His body loomed above the railing.

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"Aesoe is impressed because she has more than two hundred friends personally loyal to her."

"Impossible!" snorted Joesai.

". . . to one as ugly as you!"

Teenae soothed the hand of her largest husband without looking at him. "Is that true," she asked of Gaet, "that this barbarian commands loyalty so easily?"

"I have no reason to doubt Aesoe."

"Then the order is logical," said Teenae. "A constituency of two hundred in the Valley of Ten Thousand Graves would give us power. We cannot logically refuse this order."

"You give up Kathein so easily?" prodded Noe.

Tears burst upon the smaller woman's cheeks and ran down along the ridges of her facial cicatrice. "Not at all easily." Teenae loved the Kathein she had never seen enough of. When a family was already five in number it was difficult to find a co-spouse who could love and be loved by them all. Kathein could make Joesai laugh. She could make the taciturn Hoemei talk. She could dominate Gaet.

"You're thinking," said Joesai, returning the squeeze of her hand.

"I am thinking that the Kaiel have chosen the path of power and that the logic of power demands self-sacrifice."

"Life does not always follow logical trails!" snapped Joesai. "The bonds of loyalty take us *over* mountains, not around them!"

Teenae backed away a little from this fierce attack. She was the youngest and not yet sure that she belonged in this strange clan. She had been brought up to please men who built abstract models and who became upset if those models were found to conform to some reality. Now she was dealing with people who created reality.

"I love Kathein, too, but Aesoe has my respect as a man of formidable reason."

"His path is not that logical, my little dark-eyed beetle," said Gaet. "This woman of the coast has many friends, true, but most of them are of low kalothi and will be eaten during the next famine. Some of them are noseless criminals and will be eaten *before* the next famine. She scorns priests."

"Aesoe knows this?" blurted Teenae.

"Yes, yes."

"What is her heresy?" asked Joesai, intrigued.

"She's an atheist."

"Does she believe we come full-blown out of machines in the Wailing Mountains?" He winked. The brothers had been born from machines in the Wailing Mountains and those so brought to life spoke obliquely of their inhuman origin.

Gaet laughed. "No. Worse than that. She proclaims we have insects for ancestors."

"My God!" exclaimed Noe. "She doesn't! She can't believe that!"

"Which insect?" asked Teenae.

"The maelot."

"Logical. The maelot is the only four-legged insect with fleshy parts on the outside of its exoskeleton."

"But a maelot is so small!" protested Noe.

"The largest insects are in the maelot class. The ones who have returned to the sea can be as large as your leg. Wrong amino acids, though. Wrong

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protein coding. Not logical. We are closer to the bee than to the maelot."

"She has no place for God?" asked Joesai.

"None. She thinks the link between us and the maelot is missing because we evolved from a cannibal form of the maelot that ate its inferior offspring and so left no fossils."

"Fool. We know the day and the sun-height of the day that the God of the Sky brought us here!" stormed the tallest brother.

Gaet paused, ready to put the critical question to a vote. "Who is in favor of continuing the courtship of Kathein?"

"I," said Joesai.

The two women nodded.

"But can we disobey Aesoe?" asked Gaet, testing their resolve. "I suggest that I journey to the village called Sorrow and court Oelita." He winked at Noe. "I may bring back new ways of loving."

Joesai grinned. "You know too much already for the good of Hoemei and myself. I suggest that *I* slip into the village called Sorrow. I've been thinking that Aesoe cannot object if we court this coastal barbarian by Rite of Trial. She must earn her Place, and no Kaiel finds an easy Place."

"He will not object to the Couth Rite."

"I had in mind the Death Rite."

"That would *not* please Aesoe. Premature death is a sacrilege if it does not take inferior genes with it."

"If the Rite does not challenge her with Death, how can it be a true test of her kalothi?"

"And if she lives? She may. Aesoe claims her kalothi is of the highest."

"Ho! He hears that from the Stgal. Who takes seriously the kalothi rating of a village temple? *If* she lives, Gaet, she will be a worthy three-wife for us."

"But could she love us after we have tried to kill her?" Gaet kept his game face, but his eyes betrayed mischief. "Such mistrust might mar the harmony of our marriage."

"That cannot be my problem. To survive she will have to kill me."

"You will never be popular with women," sighed Gaet.

"Some women love only the men they defeat." Teenae's large eyes were sparkling. "I love Joesai because I always beat him at kolgame."

"Little larva!" He kissed the shaved streak across the top of her head. "For that insult I'm taking you with me to the coast as my shield!"

"A shield you think I am! I would protect this Oelita against your zeal!"

"Ho. What is this? Already the heretic's kalothi shows itself to guard her? Good. Then with you by my side I will understand her!"

Teenae turned wildly to Gaet. "He's not serious?"

"Yes. You must go with him. The Council has given us that land, but we must earn it, and neither you nor Joesai have yet mixed its dirt in the cuts of your feet."

Noe grabbed her tallest husband by the biceps and forced him against the stone, lifting her face to speak to his. "Even after Aesoe's *command*, you still think we will marry Kathein?" She was disturbed.

"Of course we'll marry Kathein!" snarled Joesai.

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4

Should we doubt because God is silent? Feel the ground beneath your feet. There is the touch of God. He brought us here. Listen to the voice of a baby learning his first word. That is God speaking again the language He gave us. When we have stilled the cacophonous noise of doubt and quarrel, then we will hear Him speak.

Prime Predictor Njai ben-Kaiel
from her "Eighth Speech"

The Constellation of the Ogre moved across the midnight zenith and was replaced by the Winner. Joesai sneaked himself through the city and, unannounced, appeared at Kathein's instrument shop.

It was an old building of stone, converted from some purpose which had once required its own aqueduct. He had never been there before. The tedious craftsmanship of experimental fail-and-seek-again asked more patience of him than he was willing to give. The shop's primary purpose was to supply the priests with more and more accurate biological tools.

"You shouldn't have come," Kathein said when she found him in the arched doorway.

"The spittle of insects! You're quick with my child. I love you. In any event, I'm here! May Aesoe give his guests diarrhea at his Feast of Ritual Suicide!"

She pulled him inside, obviously glad to see him. "Getasun's flame will die before he finds himself at the bottom of the kalothi list!" Which was where she wanted him because only then would he be eligible for Ritual Suicide.

"Ho! Find us a place where we can be alone!"

She hurried into one of the side rooms and closed the door. He found himself next to racks of bioluminous bulbs that cast an eerie pallor over bulky apparatus.

"It is for reading the crystal," she said, touching the plastic casing of the Kaiel's most advanced instrument.

"You built it yourself?"

"Joesai! I built it with the help of thirty craft clans and all the gold of the Dry Bone Mine. I'm not even sure I know how it does what it does!"

"Was your hunch about the crystal right?"

"No," she said sadly.

"It doesn't hold the Frozen Voice of the God of the Sky?"

"Yes and no," she said with puzzlement. "Do you want to see some silvergraphs of His writings?"

"My nose in trade!"

She showed Joesai the single intact crystal, shaped like a small tile but transparent. When he reached out to touch it she pulled away. It looked like glass but it didn't refract like glass. The hand-sized, corroded machine which had originally read the crystals was nearby in its own protected case. An early Kaiel exploration had found it buried in the catacombs of the Graves of the Losers, holding this one crystal. For generations the discovery was a mystery known only to the Kaiel.

To duplicate its function, Kathein's team had invented coherent light-beam generators and strange precision optical devices. She had made more advances in electron manipulation in the past 300 weeks than had been done since the

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electron was discovered. The resulting apparatus filled up half a room and sometimes even worked.

"You can't believe how hard it is to read from that crystal. There are about 4,000 layers, alternately conducting and nonconducting. The conducting layers have elements in them that go opaque in the presence of electron flow. If the approach ritual doesn't please God He responds only with blackness, but if our obsecrations are sufficiently servile only one layer is sensitized. There are 1,600 pages to a layer. Even then different pages fade in and out and sometimes whole layers of pages overlay an area so that our vision is obscured. We can go for days without getting through to God and then suddenly a patch of 40 pages will appear for long enough to be silvergraphed."

"What do they say?"

Kathein showed him a silvergraph of a single page, one of the clearer ones. She lit an oil lamp to increase the room's brightness.

"The God of the Sky mutters," he said turning the page upside down and squinting at it.

"You can read it."

"It's beetle talk. It looks like a beetle danced the maedi with ink on his feet—an eight-legger."

"No. You *can* read it." She pointed with some excitement. "That's the symbol for carbon and that's the symbol for hydrogen."

"I'll be low listed! It's a genetic map. My God!"

"They're all plants, hundreds of them. *Sacred Plants,* Joesai. There's nothing there characteristic of the coding of profane biology."

"My God! That means there are more than Eight Sacred Plants. What a strange thing for Him to tell us."

"That's what I thought," she said with deep puzzlement.

"Could He be telling us to make new Sacred Plants?"

"Joesai! We couldn't even make a wheat seed!"

"Maybe. We made my mother."

"Your mother is half human, and the other half isn't there."

"Don't you insult my mother. She has seventy-four artificial genes. How complicated can a wheat seed be?"

"God wouldn't ask us to do the impossible!"

"God could ask us to do anything. He could laugh at us. He could sulk for a hundred generations if it pleased Him."

"Don't say that! If He hears you, I'll never get another picture out of that crystal!"

"Let me try talking with Him."

"You won't get anything. I have to use all kinds of supplications to get the fineness that the reading requires."

Kathein lit a small, quick-firing steam engine attached to a copper-wired wheel she called an electron pump. She waited for a short while until the steam pressure was up, and then waited again until the electron pressure stabilized. That done, she threw switches and began to electrify one of the mysterious machines that was taller than Joesai. Banks of handmade electron jars began to glow red from tiny internal filaments. "We have to wait for them to soak up heat." Then she inserted the crystal into the machine's mouth and made delicate adjustments with little wheels.

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Time passed. The ritual reminded Joesai of a childhood toy called "volcano" which required the player to roll five tiny balls up the slope of a miniature volcano, one at a time, holding each one at the peak while the next one climbed. Impossible but absorbing.

Finally they got one clear picture, another chain of genes. "Are they all like that?"

"Yes."

"I like your devotion to God, Kathein. It's an inspiration."

She turned off the machine, and stopped the wheel of the electron pump, and doused the steam engine's fire. In the room, now quieter, she held him. "What will we do? You inspire me, too, Joesai. When Gaet thinks big he thinks of the Valley of Ten Thousand Graves. When Hoemei thinks big he thinks of administering a united Geta. When you think big you want to face the God of the Sky."

"Where do you think He came from?"

"A very dangerous place, if Geta is truly a refuge as the Chants say."

He squeezed her. Then he ran a finger fondly but roughly along the lines of her facial cicatrice. "You're the only person I can talk to about these things. I cherish you."

"Oh, you can talk to Teenae," she said, pushing him away, "and you know it!"

"Only if I formulate my fantasies as mathematical problems."

"That's good exercise for *your* mind!"

"And another reason I love you is because you make me laugh."

"Did I tell you," she added excitedly, "that we just heard that a team of o'Tghalie from the north have completed a parallax measurement of the star Stgi and found it to be at least *one million* times as far away as the distance between Geta and Getasun! That's what you should be doing if they'd let you! Do you realize what that means? The universe could be so big that it would take a man's lifetime for light to cross from one end to the other. The God of the Sky could have come from anywhere!"

"We have to get to Him and talk to Him!"

"Can you express yourself in polynucleic acids?" Kathein laughed.

"You know about these things. How would we get to Him?"

"Energy, Joesai. More energy than you can possibly imagine."

"We'll discuss it when I get back. I love you, Kathein. I'd murder to keep you."

"Don't say that! Joesai! Be quiet! If you ever violate the Code once, *even once*, you'll be destroyed by the storm you will have created within yourself!"

"Ho! The Code was made by man. Different priest clans have different moralities. God stopped speaking to us to let us learn our own way."

"Joesai, listen to me! I believe in tradition. It is there for a reason. It is the accumulation of more wisdom than one man can ever hope to master in one lifetime. I can't understand its purpose. You can't understand it. I have faith. Don't test it, Joesai! Please!"

"If this heretic has kalothi, she'll live. That's what kalothi means."

"Fecal fool! That is the justification for every sin that has ever been committed on Geta! You *know* that kalothi can be overwhelmed!"

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He sighed. "I promise you I'll be hard—but I'll break no rules."

"Take care of Teenae." Kathein was crying. "And watch out for that witch!"

5

Men are the seeds from whom a new crop shall be grown. No matter that the land is barren. No matter that the rains do not come, or the irrigation ditches blow dust. No matter that famine dries the skin to our bones. Men, like seed, are too precious to be used as food.

The Gentle Heretic in
"Sayings of a Rule Breaker"

The day was beautiful for herb hunting. Getasun, as usual, rose quickly through the sky, carrying its forge-orange bulk out to sea where it would set beside the stationary Scowlmoon. Oelita kept to the ridges along the shore and whenever she walked over a sandy crest, she stopped to drop her packsack so that she could look down upon the sea she loved. She saw a sleek Mnankrei trader blooming with sails and a small fleet of local craft dredging for iron-reed. Scowlmoon held steady two diameters above the waves, half full, telling her that it was noon.

The vegetation rose waist-high, thick and spiny, taller here than in the interior. She wore thick leggings to protect herself from poisonous scratches. It was a striped flower she hunted, good for stimulating babies who had the sleeping sickness.

Her packsack was already bulging. Once across the river bed, she planned to circle around to Nonoep's farm. He was a renegade Stgal who lived alone, a marvelous soul, and one of her favorite lovers. Having been trained as a priest he knew a great deal of biochemistry and was always willing to extract in his boiling bottles the medicines she needed. Sometimes he gave her seeds for the farmers.

Nonoep was a breeder of plants. He didn't breed varieties of the Sacred Eight but concentrated on wild plants. Many of the profane plants were known to yield edible fractions if they were crushed and dissolved and treated and filtered—but were often too expensive to treat. Nonoep grew different strains and tested them for nourishment and poison content, and bred the kinds that were easiest to process.

When Getasun had floated three quarters of the way toward the sea's horizon Oelita came across a small hill farm hidden below a wind-sheltering ridge—Nolar clan for sure, once she noticed how they cleared their land and built their hut. Spread below wasn't enough cultivated land for five, though there would be at least fifteen of them.

Oelita entered the hut without being invited. The family was seated, pounding the stringy branches of a plant that provided fibers for cloth. She sat cross-legged with them and took a stone and began to pound her share of the fibers, emptying them into the vat for soaking. They stared at her shyly while she chatted.

The women were all pregnant and old of the poison. They lived barely long enough to reproduce themselves. The family didn't clear enough land to raise an adequate crop of the Sacred Eight and insisted on eating too much of the

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palatable wild vegetation that surrounded their farm.

Oelita never tried to change these people's diet. They *knew* their diet killed them, but the Nolar clan had an extraordinarily high kalothi rating only because of their high tolerance to the natural poisons of Geta. Without that they would be nothing—so they clung to the foods that killed them. All priest clans encouraged them and bought their women for breeding purposes.

In this region the Nolar clan had a peculiar social structure. They weren't content with normal group marriage. At puberty the children were either traded to another family or were ceremoniously married into their own family. *All* the male adults were co-husbands and *all* the female adults were co-wives. The eldest and most poison-immune male had first choice of the newly menstruating female. Inbreeding was thought to be desirable because it was quick to bring out lethal recessives. The children who died were eaten.

These Nolar chanted while they pounded, the old Chants of Knowledge as simple as a baby's mind. Oelita did not believe the myth that spoke of an Age of Innocence when only the children had kalothi—but certainly the oldest songs were childlike. The Chants told how to clear the land and how to plant the Sacred Eight and how to breed for kalothi to keep the Race alive. Some told of duty and honor. Some praised kalothi. The Outpacing Chant, so lengthy it was known in countless versions, told of the journey of the God of the Sky. Some Chants were as meaningless as the Chant to the Horse Piece of the chess game. Its monotonous inanity was good for pounding rocks against fiber.

"A Horse has feet, oh one, oh two, oh three, oh four, a Horse eats wheat, oh one, oh two, oh three, oh four, a Horse is meat, oh one, oh two, oh three, oh four, a Horse can snort, oh one, oh . . ."

Only after Oelita had smashed out enough fiber for a shirt and had made them laugh with her stories did she examine the children. Three out of four Nolar children died before puberty. One baby girl, who had forgotten how to walk from feebleness, was dying.

Oelita tenderly breast-fed the girl. She kept her breasts full and productive. There was always a child to feed or a lover or a friend. Then she took a bag of medicinal food from her packsack and gave it to the mother with instructions for saving the life of the child. Someday she would come back and talk a disturbing form of religion.

One of the hovering children tugged on her arm. He had something special to show her. She had noticed how bright his eyes became whenever she spoke of the bugs her father collected. There out in the meager wheat field the boy showed her some beetles, common underjaws, as if they were a great mystery.

"They're Horses?" he stated without conviction.

"Why would they be Horses?" she asked gently.

"They're eating wheat!"

Indeed they were. The underjaw was a very stupid beetle—being known on occasion to eat the wheat which killed it. She humored the boy, remembering her own excitement at bringing common beetles to her father in the hope that

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somehow she might have found something unusual for his collection. But Oelita's trained eye nagged her. After a moment she realized what was wrong. Dozens of the underjaws were eating—and no dead beetles lay on the ground.

How peculiar.

She collected some to show Nonoep, rewarding the boy with a present, and thought no more of the matter. It was dawn again and she had to leave. She planned to make Nonoep's farm before low sunset so that her sleep would be in his arms, but suspected that she was too far. She walked and gathered, flooding her mind with ideas. When she rested she wrote up the resulting harvest of religious thoughts.

She had taught herself how to read and write, her father being illiterate —mostly because he was stubborn. But *he* had taught her how to think. He had been a brilliant man, devoted to the study of insects. His special fascination had been the eipa, which spent its life in the sea and then metamorphosed into a form that flew inland where a variety of carnivorous plants ate it for its water and, in exchange, hatched its eggs. The infants flew back to the sea and transformed into their sea shape. How he deduced these things was Oelita's introduction to logic.

She missed him. Strange that she was a vegetarian and spoke out fiercely against all forms of cannibalism but the moment the tower message came, recounting her father's death, she had driven herself mercilessly—running much of the way for three dawns and sleeping in the sling of a hired Ivieth the remainder—so that she could be at his Funeral Feast. She had begrudged the others, who ate of him not knowing his strength and kindness and constant humor. She still carried dried and salted strips of his flesh that she ate only when she needed superhuman strength. She wore his hide as her best coat and it was his bone that was the handle of her knife.

Oelita wrote obsessively, never being without paper and ink. She often gave her disciples the task of copying what she had written as a form of burning her words into their minds. She wanted her letters and small books to be sent everywhere so that it would never be possible for the priests to silence her by destroying them all. In her sleep-creepies she goaded people to copy faster. In her pleasant dreams she owned a printing press.

By sunset she had not reached Nonoep's farm and she was tired because she had been awake since two dawns past. She built a fire and heated soup and laid out her mat for sleep. The bloody sun died in Ritual Suicide, clotting to a deeper red as the stars one by one appeared, creating their celestial Temple. Sometimes she was lonely sleeping in the open at night. She missed being traditionally religious. Geta had such a rich mythology about the stars. She still wrote the old heroes into her stories.

Swiftly, the God of the Sky appeared and drifted overhead. She followed His flowing path until He dropped over the horizon. *Ah humans!* she sighed. When life was so harsh that a man lost all hope for himself, then he raised his eyes to a shining rock, worshipping it, just to

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find hope again, rather than looking to his own acts for hope and salvation.

6

To play kolgame is our sacred duty. How else can the Race remember to struggle for the total Union of Geta under the One Sky of God? How else can the Race remember that Union can only be achieved through relentless allegiance to the priest clans? How else can the Race remember that, to win, a man must break the rules, but that to break the rules is the worst risk a man can take?

From The Temple of Human Destiny's "Games Manual"

The oil lamp gasped to stay alive like an old bee buzzing its wings erratically along the ground. Teenae lay beside Joesai, watching him pass into sleep by this flicker. He looked so peacefully evil. So much she didn't know about him. He had been a professional provocateur, a veteran of many successful missions into non-Kaiel lands. Was it fair to launch him and fifteen of his chosen against one woman who had no warning of his coming?

She smiled her love for this man. She felt protected by his experience and the agile massiveness of him. No desire to thwart him was in her breast but still, fresh with the warmth of his love in her loins, she began to formulate her own plans.

She was sure she was a better strategist, even given the handicap of no experience. Didn't she always beat him at kolgame? And not only could she beat Joesai, she could also beat Aesoe. What did those two know of human emotions? It should be possible to enlist the heretic woman as an ally without marrying her. Then Aesoe would have what he wanted and they could have Kathein, and nobody would have to die. Why couldn't non-mathematicians ever understand optimization? She kissed Joesai's nipple just the same.

Sleep did not come as she weighted plan against alternate plan. They were so close to Sorrow that she had little time. Eventually intense thinking made her sweaty and hungry and too nervous to lie still. She sneaked out of the tent, naked, to rummage through the supplies for hard bread by the light of Scowlmoon, now nearly full because of the lateness of the night.

Dull red moonglow shone on the shaved centerline of her skull, dyeing her cascading hair blacker than it really was, etching soft shadows into the carved designs that covered her body so that she seemed almost clothed while she stood there tearing the bread with her teeth. Fierce was her pleasure in the cold mountain breeze. The wind moaned the old song of the Wailing Mountains. The river in front of them meandered to the coast and had long ago eroded away all obstacles between here and the Njarae Sea.

One of the Ivieth porters, as tall as Joesai but heavier and longer of leg, noticed her and rose from his pad. "Is all well?"

Her teeth flashed. "Hunger."

"Soon we have warm starting broth. See, the eclipse has already begun." He gestured at the moon. "It is almost dawn. Go back to your man's flesh."

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She shrugged, smiling. The Ivieth were humble—except when they were being responsible for you on a journey. The roads they built and guarded were safe. "I slept all last night in the palanquin." That had been high night when it was not the custom to sleep. "*You* return to your pad. *You* need the rest."

"An Ivieth needs no rest."

It was almost true. The Ivieth clan had been bred, by their own standards, to keep moving no matter what the barriers—mountain or heat or fatigue. It was not uncommon for an Ivieth to pull his wagon seven days and nights without sleep.

"A kolgame then, by the dark of the eclipse!" she challenged.

The rules of this game are known by every child, every clan. Legend attributed the origin of kol to the need for an intelligence test to select those worthy enough to feed their brethren. In starvation times where temple kalothi records were unavailable, kolgame tournaments were still held, losers donating their bodies for the survival of the others.

The dawn found Teenae crouched with her chin on one knee, in the shadow of the naked Ivieth, playing with such intensity that she scarcely noticed the waking of the camp, or the fires that heated the broth, or Joesai when he came up behind her, soaping the centerline of her scalp and shaving it so that she would be presentable for their entrance into Sorrow that day.

Teenae won. Yelping, she hugged the Ivieth warmly. If you wanted Teenae to hug you, you had to lose to her at kolgame. She was a sore loser. Joesai had her robes out and patiently dressed her, trying this and that for effect, aided by the good-hearted comments of the company. And so the expedition, which had been waiting, got under way.

The salty sea wind was breathtaking as it blew in from the ocean below the hills. She was awed. She had never seen the sea before. The village clustered small about one crooked inlet. Its magnificent temple seemed to be a she-magician who had shrunk the village spires and buildings into a doll city about herself. Teenae was pleased to ride into town beautifully robed in a decorated palanquin carried across the shoulders of a superbly muscled Ivieth couple, Joesai on foot beside her.

"Stay by me," she whispered. She glanced around curiously for danger but found none, only seamen and merchants and Ivieth pulling wagons of farm produce.

The "goldsmith" and his wife were elaborately welcomed at an inn overlooking the pier and provided rooms with a view of the village. The stone walls of their apartment were hung with old tapestries of men laughing at family funeral feasts. Once their belongings were hung away, the innkeeper personally bathed them in the scented waters of his public bath and insisted on serving them their first meal in the kitchen.

Fifteen of Joesai's band trickled in, one this day, two the next, some by land, some by sea, busying themselves learning about the village of Sorrow. A "tailor" talked with tailors. A young "Clei" woman took on writing contracts. A "stonemason" asked after the new road work. A "merchant" hurried through town looking for a house to rent. A "sailor" gossiped among the

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import-export traders. Joesai sold fine gold pieces and listened.

Unobtrusive, but everywhere, was the Scar of the Heresy—a stem with its four wheat kernels each ending in a long fiber. A woman would have it tattooed between her breasts or it would be formed into the margin of a tailor's sign or be embroidered upon a tattered coat. Its message was constant: Do not eat those weaker than yourself; do not eat the malformed child, the noseless criminal, the cripple, the feeble-minded, the wandering madman, the blind, the incompetent.

"It's always been that way," Joesai grumbled cynically. "We're a generous people. We've always been willing to fatten the feeble-minded—when the harvest is good."

"Why are we so harsh?" asked Teenae, moved by some of the things Oelita had written.

"It's a harsh world."

"It's our duty to make it a less harsh world. We're *Kaiel!*"

"Yes, my little *o'Tghalie* imp!" He roared with laughter. And then added as an afterthought, thinking of his childhood, "Only the harsh survive."

"This Oelita is not harsh.' She is strong. She believes that teams working together can make harshness unnecessary through the power of cooperation."

Joesai strode across the room to the tankard in dismissal. Ferment refilled his blown-glass cup. For a while he stared at the feasting mourners on the tapestry. A child, crouched in a corner, was gnawing the meat off his grandfather's ribs. Peering through the liquid in the bottom of the green cup, Joesai commented. "God has gone to great lengths to tell us that there is *no* escape from harshness." He turned on Teenae, almost savagely. "Why did He bring us *here* if not to teach us that!"

"Maybe to teach us that no matter where we are, there is hope!"

"Hope. Ah, yes. Hope is the irrepressible heresy."

"This woman will bring hope, even to you, Joesai."

"Soon, then. My boy Eiemeni has found her."

Teenae's breath froze. "Is she dead?"

He laughed. "Ho. The Death Rite does not start with death. And it does not always end with death. If it always ended with death, the Rite would be pointless."

"What have you done to her?"

He shrugged. "Nothing. We have not yet set the trap."

7

Always expect the unexpected. But if you are sure that the sun will not rise because it has always risen, then expect the sun to rise. The day you have learned to trust your friend, expect betrayal without wavering from your trust. Be ready for your enemy to befriend you. Such contradictions should not perplex. They arise only because there are more rules to an open game than can be known. Even God expected man to be good.

Dobu of the kembri,
Arimasie ban-Itraiel in "Sight"

Oelita watched the glassblower. Lazily the glass flowed and grew on the end of his pipe. Suddenly he would at-

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tack it and pull or whack the slick mass to the shape he wanted. He peered into the blazing kiln and readjusted the band around his wet forehead. In three days he had nearly replenished Nonoep's store of glassware and was ready to move on.

While he worked he told her of the young boy who had been carried in an iron-reed basket to Remiss to have his nose cut off. He banked the kiln fire. "Soon I'm off to Kaiel-hontokae. I'll bring you back better gossip!"

"Kaiel-hontokae is far!"

"So I dirty my feet. The better to learn new ways."

"Come." She took the man's bicep with both hands. "You're finished here. I'll take you down for a bath."

"I'm seduced by your gentle fingers but my enthusiasm is tempered by the knowledge that I will have to endure a long lecture on religion with the bath!"

"I'll clean behind the ears of your soul. They're filthy."

At the pool, which Nonoep maintained above his fields for irrigation, they stripped on the dock beside the great treadwheel that lifted water by a climber's effort. They dunked their clothes, pounding them clean.

The glassblower dived into the pond and when he emerged Oelita pulled him up on the planks and began to soap him as she tried out new thoughts she was having on the important differences between human will and human strength. Finally he threw her off the dock to shut her up and jumped in after her for the double purpose of rinsing himself and keeping her head underwater.

"So! I thought I heard merriment!" Nonoep had appeared through the brambles on the rise above his pond. "I'm a proud father today. I have a wonder to show you, Oelita."

She emerged from the water, sputtering. "My clothes are wet. I can't come. I'm naked and I'll get scratched!"

"You can have my shoulders."

"I'll get dirty again, you stinking old farmer!"

"It is our fate to get dirty again."

The small woman rode high on the shoulders of her lonepriest lover over the rise, down into the east field. "You'd make a great Ivieth," she said, enjoying the jog.

"I may join them someday to see the world."

"Where are you taking me?"

"Remember the first day we met?"

"How could I forget such an overpowering event? You were sitting on a barrel of wheat and dribbling honey from your bread into your beard while pontificating about the stubbornness of profane botany."

"About hair-weed in particular."

The nodules of the hair-weed were relatively free of the poisons—however, because of their smallness, were hardly worth the pickings. To his frustration, Nonoep had tried raising hair-weed with larger nodules and, in that grain store in Sorrow, had been complaining about his failures. Oelita then barged into the conversation with a detailed explanation of the symbiosis between hair-weed and certain insects. It had been a revelation to Nonoep, and he had courteously invited her to come and stay at his experimental farm whenever it pleased her and was rather surprised when she hung around and followed him on the long

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trek home and took him as one of her lovers that very sunset.

"That's my latest patch over there," he said.

Gentle with her body, he set Oelita down beside some of his cultivated hairweed, new in its vigorous growth. Stooping, he showed her the gorged nodules along the stem.

"Ah," she said, her eyes bright. "You found the right kind of burrowers!"

"No. That proved to be impossible. I *bred* them."

"Your ways have changed since you met me!"

"Perhaps," he said, lifting her up again to ride on his shoulders while he headed down toward the buildings, "but I'm just as lecherous as ever."

"And you're still willing to eat meat," she reprimanded, pulling his ears.

"Have I had so much as a morsel since I met you?"

"There hasn't been a famine since you met me!"

He seemed to sag under more than her weight. "There will be another one soon."

"You can't be serious!" She tried peering over his head to see his face. "The wheat crop is spectacular this year!"

"Have you forgotten the deviant underjaws you brought me? The first batch of eggs have hatched. They *do* eat wheat and aren't affected. I was amazed. The local underjaws that I collected die on the same diet."

"Will the deviants multiply?"

"Yes."

They reached the house. "What can we do?"

He was puzzled by something that fit nowhere in his priestly knowledge. "An underjaw doesn't have the enzymes to digest wheat. I need advice. I'm going to send some eggs to Kaiel-hontokae with my glassblower."

"You wouldn't!" Oelita beat on his head and jumped down. "I don't want to deal with the Kaiel!" She was enraged at the mention of that name.

He laughed and followed her through the curtains. "They are the best geneticists within walking distance. Or on Geta."

"They breed babies to eat! You can buy meat in the markets at Kaiel-hontokae! *You* cope with the underjaws! *You* know genetics."

"I'm a farmer. The Kaiel are the magicians."

Furious, she disappeared into their room and began packing. When he saw that she was going to leave, he argued. She dressed in leggings, swung a full packsack onto her back, and marched out toward the pool to pick up her wet clothes. Nonoep followed her, smoking in angry defense of himself like a huffing steam machine on wheels. She had assumed the tactic of not replying, so he alternately invented arguments for her and answered them. Unreached, she stuffed her wet clothes into the packsack and headed toward the northern trail that branched up to Sorrow. By now, sulking at her intransigence, he walked silently behind her.

On the edge of his land, Oelita turned. "You insist on dealing with the Kaiel?"

"There is no other way!"

She wheeled and left him.

He watched her little figure disappear

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through the brush, loving her. *Damn fool woman!* he thought.

And she listened to hear if he was still following. When she was sure that he was not, tears came to her eyes and she stomped on at the quick pace of the agitated, flinging branches out of her way and ignoring the vegetable claws that tried to rip her boots and clothing.

Anger is quickly burned in active legs. By afternoon she was only thoughtful. Her frustration again flared briefly when, hungry and ready to eat, she remembered that she had forgotten food.

Impulsively she set a course toward Gold Creek. That meander would make an easy night journey to the sea from where she could work her way along the beaches to Sorrow. It was not her usual route and she was not quite sure where she was until she crossed the old gold camp. The sluice runs had created dozens of tailing fans of sand that had not yet succumbed to the crawl of life. She perked up her ears. Yes, she could hear the low rumble of the sea through the gorge.

The path narrowed. She listened to the gurgling call of a river maelot enticing his female and was caught for a brief moment in a swarm of gliding issen whose finger-long wings imprisoned the moon glow in their veins. The trail narrowed still more and disappeared in a landslide, so she edged down into the water and began to wade. The water was low and sluggish and offered her little resistance. There was no reason to look for a better path until she saw two rocks ahead transmogrify into the shapes of men.

Travelers, she thought gratefully. *They'll lend me food.* But instinctively she peered back and around her for an escape route should that prove necessary—and found two other silent men moving in on her from behind.

8

If one man says whore and another hears hoar, of what use is it? Speech, no matter how eloquent, is not communication. If one man draws a star and another sees a cross, of what use is it? Pictures, even if they contain color, even if they move, are not communication. If a man caresses a woman and the woman feels the blade of a knife, of what use is it? Touch, no matter how deeply felt, is not communication. For a communication to happen, the construct in one mind must be duplicated by another mind.

Foeti pno-Kaiel, creche teacher
of the maran-Kaiel

Traditionally Getan messages were carried by travellers and, if speed was essential, by Ivieth runners or by the flags and lights of the towers. Over difficult terrain some of the modern towers were connected by wire. But fantastic change was upon the land.

Kaiel neurophysiologists, curious about the electric field of the brain, had hit upon a trail that took them to mechanically induced electromagnetic radiation. Suddenly the Kaiel leadership found itself with a message network several orders of magnitude swifter than the network of every rival.

Hoemei was a member of the team assessing the most rapid way to exploit

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what they all knew would be a temporary advantage. He spent days at the communications command center in the Palace among the shelves of coils and electron jars puzzling over transcripts of rayvoice calls.

Hoemei's electromagnetic eye took in the whole of the immense Njarae Sea. His agents were established at fourteen key points. Over the weeks as he attempted to shadow Joesai, he became increasingly fascinated by what he was seeing with his new toy. Joesai remained invisible—but the view!

He found himself watching game players who thought they were hidden. *The Mnankrei were poised for a lethal strike against the Stgal.* In his notes it all came together. Even Aesoe would be hard pressed to believe their boldness, because such a plan broke too many rules. And Joesai: innocently Joesai had entered the focal center of their game, unaware of the fury rising distantly at sea.

Hoemei stood at a circular window of the Kaiel Palace, his back to the electrons that leaped across hot wires through net to dock, his mind flickering with images of far places superimposed upon the image of his city. Kaiel-hontokae had been built on the ruins of the Arant to guard against the return of heresy but had itself been slowly possessed by questions which led to newer heresies.

I will need Noe's counsel, he thought.

Hoemei had been enjoying his days alone with Noe in the stone mansion on the hill. Gaet was away. Joesai and Teenae were far away. Their absence gave him time to explore this woman whom he had never understood, who was never in a hurry to be understood, who alone of the women he knew relished power.

When Gaet first brought her home to their bed, Hoemei had thought of Noe as a scatterbrain. But she had her own direction. She indulged in luxury but was a master of cross-desert hiking that required a stoicism approaching art. Was it style she craved? Her only consistency was style.

He shook his head. There was a gulf between them. He was the disciplined product of the creches, where a child demonstrated his abilities quickly or was sent to the abattoir. She was a pampered child of riches.

When he entered the courtyard of the maran mansion she was placing a bowl of profane flowers called blooded-teeth. An excited bee had found the bouquet. Lovers were said to forget all quarrels near this aroma. Hoemei was touched. The gesture could only have been meant for him. "My love," she smiled, but hurried on her way to the kitchen without kissing him.

He lingered near the flowers, fragile white petals with red rims, guarded by a stem of poisoned spikes. He sniffed, then followed Noe's scent, faintly smiling. She was like a flower, herself.

She fixed him an appetizer of baby liver pate on crunch bread. That was so like her. She always had delicacies around regardless of the expense. "I discharged all of our due-debts today," she chatted.

"You can slaughter a whole day that way."

"But I arranged it so I visited half my constituency while I did the money rounds," she said smugly. "And you?"

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"How would you kill an underjaw beetle?"

She laughed. "Step on it."

"Millions of them. You know about such things. I don't."

"Why?"

"I'm about to make a fateful prediction and some policy decisions. They will be registered and witnessed for the Archives. The outcome will drastically affect my kalothi rating one way or another. My unconceived children will live or die by this decision."

She looked at him sharply. "Gaet and Joesai and Teenae should be here."

"No. The decision has to be made tonight. And you are the perfect person to advise me. You know the rituals of genetic modification."

"Only what Joesai has taught me."

"But you are better at it than he. And your mother ran trading fleets against the Mnankrei. You have a feel for those wind riders."

"They dominate through trade."

"Exactly."

He took her by the wrist and pulled her into the study where he rolled out a map on the table, weighing down the corners with carved ancestral skulls from Noe's and Teenae's families. The largest of Geta's eleven landbound seas, the Njarae extended along a northeastern diagonal one fourth of the way around Geta, fat to the north, narrow to the south like a poised club. Sorrow hugged the western shore formed by the Wailing Mountains. The Mnankrei islands lay to the north but the Mnankrei priests had generations ago spread from the islands to the northern plain. Hoemei moved his finger down from the Stgal mountain reaches, far south into the Stgal Plain, a distance covered by bad roads and controlled by six loosely confederated Stgal clans.

"There's famine here."

"I heard it was a good crop."

"It was. Plagues of underjaws are eating the wheat."

"But they die when they attack the Sacred Food!"

"These don't."

"Oh my God!" The idea was terrifying. It was a disorienting event, like God falling from His sky. "A mutation?" She couldn't imagine a mutation that drastic.

"No. I've had my men on it. We've been in constant contact via rayvoice. They haven't got the equipment they need, but one of my women is of the creches and she's a brilliant microbiologist. You wouldn't believe the shortcuts and sidestepping she can do. The underjaws are manufacturing some human enzymes."

"They are carrying human genes?"

"Exactly."

"Now *that* is a Violation of the Rules," she said, awed by someone's audacity.

"Could it be done? That's what I want to know."

Noe retreated into a deep scan of her knowledge. "We made your mother."

"Yes, but she's human in her way. I didn't think it was possible for sacred and profane cells to operate together. Incompatible coding."

"I could think of ways. It would be difficult."

"Then it is the Mnankrei who have unleashed this plague."

"Not the Mnankrei I know."

"Look. The rayvoice has given me

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an immense vista." He swept his hand up the map. "The port watchers are sending us data on every Mnankrei ship movement. Relief ships loaded with grain left the islands for Stgal Plain harbors *before the plague even started.* And now they are departing for the northern ports. A grain ship set sail for Sorrow even today. It is like carrying honey to a beehive."

She picked up the skull of her great-grandfather, carved in swastikas and leaves. "What would you say, Pietri?" He said nothing. "Pietri died in defiance of the Mnankrei, so goes the family story. It was a famine. The Mnankrei offered food in exchange for control. My great-grandfather offered his body at the Temple to keep the Mnankrei away." She smiled ruefully. "They came anyway. They come during famine. Food for control. Always, always, always. My grandfather wedded himself to the sea as a free merchant to take their hand from his wrist."

"Food for control," said Hoemei darkly, "and now famine to create the need for food."

"If that be so, the upperclans must call a Gathering of Judgment," she replied grimly.

9

The Death Rite shall be invoked only in the case of heresy and shall consist of never more than seven trials, for would not an endless trial become persecution? Though each trial conjures a more subtle death, each death, even to the seventh, shall leave open an escape that can be perceived by an adept of the common wisdom, for is not the common wisdom a memory of the Race's escape from Death? And is it not the common wisdom we are protecting when we challenge a heretic?

From "The Kaiel Book of Ritual"

Oelita was bleeding to death tied into the iron reed basket by thongs through the center of her wrists, bobbing in a small cove, half drowning every time a large wave broke over her head. When she wasn't struggling to breathe, the agony in her wrists throbbed with a heartbeat still in panic.

It wasn't an actively threatening trap. If she kept her legs stretched out, she could stay afloat with her head above water indefinitely—except that blood loss would gradually weaken her. She had to act *now.* Yet there was nothing she could do! She could move her legs, but if she worked them forward, her head dipped back into the water and she began to drown.

She tried to think, but the only thoughts that came were the useless "what if" thoughts of a mind that has given up the present as hopeless. What if she had moved faster when she first spotted the men? She had attacked two of them before the other two had a chance to close in. She had been fast enough to knock one down and swing a rock toward the other's skull, but he had been miraculously evasive, and there had been no time for a second swing.

A wave poured water into her nose and brought her coughing back to the present. But there was only twisted rock and iron reed trap and pain. *The Mnankrei,* she thought. The Mnankrei would

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use the sea to initiate their Death Rite. But the pain was too great for thinking. She sank far back into the past, squatting with her father in the sand beside a lone gnarled tree that squatted, too, watching four executioner ants keeping an armored beetle at bay, patiently waiting for the beetle to weaken.

Oelita jerked. Her father was dead. *How does a Mnankrei think?* She rode the sea. She was a boat. She was a sea captain. There had to be a way out. A Death Rite Trial was always a formal puzzle. She could pull her legs up and the trap would flip over, pinning her head underwater. Maybe she was only meant to think she would drown? Maybe the trap would fall apart once it had capsized?

Oelita was gripped by an irrational desire to try that sudden maneuver—what other choice did she have?—and if she drowned, what did it matter; certainly she was going to die if she did nothing. But a keen analytical mind did not allow her body impulsive gestures. She began to build the iron-reed trap in her mind, the way a master weaver would build it, imagining the pieces she could not see. If it was going to fall apart, how would that come about? The question gave her a picture.

She prodded with toes and craned her neck. She cursed her toes for not being fingers and gave up and watched a turbulent stream of red blood from her wrist drift away in the green water. She tried again. The reed caught against the lock-fork—and slipped off. Again, desperately, she manipulated her toes and this time, while the reed held, she flipped, her lungs full.

Fright kept her eyes open to see the murky bottom rotate into view, almost touching the fine seaweed that released a darting eight-legger and—*nothing's happening I'll die here*—but the trap slowly came apart under the shifting of weights and she staggered onto the pebble beach, nude, dragging the trap by the thongs through her wrists, unaware of the pain, until she sank to her knees, crying, wondering only how to rid herself of the thongs. Blood began to paint her palms, merging with the wetness, to run down her fingers.

She saw it then, the tiny ceremonial table holding a bronze knife whose handle was worked in the stylized wave design of the Mnankrei and set with stone fragments of blue and white, an ironic gift from someone who knew what she would need if she got this far. The knife she used with unwilling fingers to sever the thongs. Her attempts to bind the wounds failed—her fingers were too useless—and so she merely wrapped around her waist those thin pieces of leather that had been stripped from the back of some poor man of low kalothi.

Oelita found her packsack upstream with her clothes neatly folded on top of it. So they expected her to live. That implied future terrors of a fiendishness that would grow more complicated with every new trial.

To flee or to dare? She chose audacity partly because she knew the rules never condoned a second trial on the same day. She returned to the iron-reed trap and built a bonfire with it on a rocky prominence facing the ocean. Let the Mnankrei see where she was!

"Ho!" came a voice from the night. It sounded like the call of the chief

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priest of the clan of darkness. She looked for the voice but saw only a horde of hidden ghouls ready to attack. "If you come closer I will kill you!"

"And why should I cause such fear?" the slightly foreign voice boomed.

"I'm hardly afraid of you!" Her arms were trembling. "It is just that I'm in a particularly foul mood!"

"Did the ship that left awhile ago leave you behind?"

"You saw a ship?"

"A small one."

"They are no friends of mine! And who are you?"

"Joesai the Goldsmith. I've been looking over the old gold diggings."

"They are worked out."

"Ho! You think that! I've already panned a spoonful of dust."

"Come into the light of my fire."

Joesai walked down a slope and out of the underbrush. He had been farther away than she had guessed. He stopped, well out of range of her knife, a tall man, bigger than most who were not Ivieth. That softened Oelita. He could not have been one of her attackers.

"You are injured," he observed.

"A minor injury," she replied defiantly.

"You could not use that knife."

"My feet are deadly."

"Are the wounds fresh?"

"Bleeding and painful."

"Let me examine them. I'm a surgeon, better than most." He did not move forward.

She looked at the smiling man. She knew he would go if she ordered him away. "Can you dress stabs? I can show you how. My own fingers are too swollen and weak."

"I promise better than that." He came forward and asked her to sit while he examined her wrists. "Let me take care of it now. I'm a master. The scar will blend with your cicatrice when I've finished." He took out tools before she gave permission. "These are no ordinary wounds," he pronounced.

"No." She cringed as he began his work.

"You have enemies," he said, and his finger sent fire through her arm.

"All those who are loved fiercely have enemies."

"You must be the Gentle Heretic."

"Some call me that."

"Cause for astonishment! My two-wife is a student of yours. She is not a great intellect."

Oelita laughed. "You may not be a flatterer, but you have a kind way. Kindness is what I preach."

"I am ruthless when it suits me. Can you walk? We'll do better at my camp. I have food. You need not use your hands and I'll serve you a feast."

"You adopt my enemies very easily."

"Should a big man like me fear men who would attack a defenseless woman? I'll walk you back to Sorrow. Perhaps you would grant two-wife an interview?"

"No. The Mnankrei Death Rite is upon me and I needs hide. The ground has ears. No one should know my whereabouts."

"Then I will show you where to contact her, and you may arrange a meeting whenever and however it suits you."

They walked back up the stream, wading most of the way near the edge, jumping along rocks and boulders where

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the water was shallow. He showed her the outcropping that had borne gold, and where a tunnel should be carved. "Overlooked riches," he said. "Some don't have an eye that sees underground."

"You trust me to know this?"

He laughed with amused force. "Hasn't two-wife told me to trust the Gentle Heretic in all ways? But I do not need trust. I care not who digs the gold, as long as I am the one who buys it."

Joesai's camp was only a tent big enough to crowd two men. He built a fire and busied himself preparing cake and potatoes and a sauce he frequently insisted that she taste and judge. He was so oblivious to danger that she relaxed. Getasun rose, rouging the eastern hills, before the meal's aroma was on the air from the bubbling pots. They ate with the full orb of Scowlmoon hanging over the thick-leaved brush trees to the west. When they stood up, they could see under the moon a faint horizon of purplish sea. He fed her and teased her as if she were a child.

"I'm beginning to see the source of your innocent philosophy. Now open your mouth and have some potato."

"Do your penetrating eyes also see my heart of gold?"

"There is no heart of gold in your bosom. I see a heart of flesh that pumps blood to your blushing cheeks."

10

It is a fast bee who escapes the fei flower. Thus the magenta fei country breeds swift bees who have mastered a quick sip.

Proverb of the Og'Sieth

Benjie was what the clans called a dobu; in his case, a dobu of machine design. But he was more than a creator of machines; he was a dobu, class eight, and the og'Sieth clan recognized nothing higher than the eighth level. He had the beginnings of wrinkles and the easy manner of one who has already made his mistakes.

"You always have a problem when you come to see me," said Benjie.

"Haulage is the problem," grumbled Gaet. "Nothing to discuss while we are sober. I was thinking along the lines of a mechanical Ivieth, a machine that can run day and night harnessed to a wagon, faster than any man can run."

Benjie began to laugh. "Wait until you are drunk! Wait!" He held out his palms in a stopping gesture while he choked on his laughter. "Not now!"

Gaet made no further mention of his wild schemes. He bought a keg of mead for the communal party and helped his friends set up the tables and bring in food to the mountain village's small yard.

He forgot his troubles. He wasn't a man to stay worried when the whisky was out. He listened to the singing. The voices were resonant enough to echo off the hills and carry along the vales up to the mines and down into the worksheds of the og'Sieth buildings that surrounded the tunnelings.

As the party progressed Gaet found himself with his arms around two wives of Benjie who were boasting that one-husband could build steam engines so tiny they crawled through the eye of a needle towing a thread. The triplet

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found their dobu at the food tables, his mouth full of a red potato salad that had been delicately bittered with profane fruit.

"Are you sufficiently pickled to unburden your troubles?" grinned Benjie.

"How about making me a steam engine as big as a silo, say with forty wheels to roll on."

"Forty wheels! When you were sober you wanted from me a mechanical man! How will we fire this giant silo—with your ego?"

"I just got a rayvoice briefing from my brother." The drink was making it difficult for Gaet to think. "A famine is moving up the coast. There will be refugees. He wants me to begin setting up relief stations so they won't all die in the mountain passes. I thought we might carry food to them instead."

Benjie was now eying the spice cake. "They won't starve. The Mnankrei have wheat to sell. The days of the big famines are over."

Gaet had already weighed the political consequences, working a dozen alternate futures through his mind. "That's what I'm afraid of. They'll sell their wheat, and you know the price. The Mnankrei are expanding too fast. Craftwise they can't begin to match our resources, and yet they are making boots out of us. It is the ships. We can't keep up with their ships!"

A loud voice, somehow attached to perceptive ears, guffawed from across the busy courtyard. "Ever seen a Mnankrei sailing in our desert?" The laugh was drunkenly slurred. "They're going to put wheels on their boats. Sail 'em right up on the beaches." The laugh went out of control. "Soon they'll be chasing our asses right across the Itraiel Plain." Helpless tears were rolling down the speaker's cheeks and all those around him were laughing in resonance. "Ever been chased by a boat across the Itraiel?"

Benjie joined in the game of chewing on Gaet's leg. "I think it is just that the Mnankrei are more intelligent than the Kaiel."

"You think it takes brains to stick a wet finger in the breeze?"

"Ya, but Gaet, they *have* to be smarter. They are the fastest Cullers on Geta. They mow their wheat before it is blade-high."

"Only one out of five go to their temples," answered Gaet aggressively. "That's no record. I come from the creche. Don't talk to me about Culling."

"I can't say as I see how that puts you ahead of the Mnankrei," Benjie continued to tease. "It depends upon what you Cull for. How come they let an oaf like you get through? A silo with forty wheels!"

"They couldn't resist my smile."

"See what I mean?"

Gaet's mind was permuting the conversation. "All right, Benjie, what about sailboats on wheels? Why not?"

Benjie looked him in the eyes.

"I said, 'Sailboats on wheels'."

"Silence of God, I do believe you're serious!"

"Of course I'm serious!"

"No, no, Gaet old friend. You run the world." Benjie pointed with exaggerated emphasis at the priest. "Let *me* build the machines." The drunken repartee had begun.

Gaet backtracked along his mental maze, knowing he was onto something

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important. He sensed it. His mind had that wild flavor. "Why *not* a silo-sized steam engine driving wheels? I've seen your little models with wheels. I've seen your power engines in the Cloister!"

"Sure, sure, I can build you a big one. We just built a monster for the Palace to run one of those electron pumps." He was saying yes, but the tone of his voice was saying no.

"How long will it take?"

"Gaet, that's not the point. Cris, come here." He nodded to a wise old o'Tghalie who was drinking quietly by himself. "Gaet, I know what you want. Let's postulate a land-based haulage fleet that can move as much freight at the same speed and over the same distance as the Mnankrei wind fleet. Tell him, Cris. We've gone over this backwards and forwards for a couple of thousand sunrises now."

Cris generated the relevant numbers from his strange o'Tghalie brain. He showed how fast the desert vegetation would be stripped to fuel the engines and to reduce the iron oxide for the iron roads—and how fast it would grow back and how much labor it would take to collect the fuel.

Benjie summed up the argument: "You want to preside over a nation gone to sand, go ahead. God's Streak, we could do *anything* if we had the wood!"

Gaet paused. A Kaiel who made decisions had to register in the Archives what he thought would be the consequences of those decisions both in the short term and the long term. To be proved wrong by time meant that his genes would be purged from the liquid-nitrogen sperm banks of the Kaiel creches.

"But there *must* be ways to move as fast across the land as a Mnankrei ship flies across the sea!"

"There are—and they all gobble fire."

"I'm not so sure. Think about it. It is said that God moves without effort and He circles the whole of Geta seven times for every sunrise."

"Have your creches breed Ivieth for gods, then," said Benjie drunkenly.

Gaet went to bed earlier than he had intended so that he might begin immediately the work Hoemei had thrust upon him. It was chilling to think of losing the coast to the Mnankrei. Failure on the family's first assignment from Aesoe would be fatal. There were too many other families in line. The five of them would find themselves administering the Kalamani desert. Better to end up as soup and ceremonial vests. He needed to talk to Joesai. But Joesai was not a rayvoice man. Curse the distance. He dreamed about the mythical wings of God.

Artists had visualized the wings of God as if they were the great-laced lifting fans of the hoeila, the one insect that could soar halfway around the globe before it died. How the hoeila sparkled on the breezes! The fine tough fabric of the wings was so iridescently beautiful that it was prized by women to sew into their sexual finery. God's wings, myth said, were even more beautiful but so fragile that they did not float on air but took life only from the purest blackness, a black so black that even light was eaten without a trace.

In the morning, wild and elated screams were interlaced with Gaet's dreams. They were happy screams but

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blood curdling enough to send all the beetles within a day's walk scuttling for their burrows. *Ah, the revel is still alive,* he thought, waking up. The boisterous merrymaking continued while he washed his face and shaved—until his curiosity was tickled enough for him to peek down over the courtyard.

Five grown men and eight children were chasing a contraption about the flagstones that was circling this way and that in mad escape manned by a frantic og'Sieth youth whose feet were pumping up and down but never touching the ground. The "wagon" he was propelling was hardly a wagon. It had only three wheels, two large ones in front and a small "rudder" wheel in the rear. The wheels were so insubstantial that there seemed to be no supporting structure between axle and rim. Even the wagon framework was missing, being replaced by what appeared to be light steel tubing.

Later Gaet examined the machine after it had broken down and been removed to a thatch-roofed shed for extensive rethinking and redesign. The argument of the evening, evidently, had continued to evolve after he went to bed and since it was a party of craftsmen, not all of them articulate, they had settled the matter by building what their drunken imaginations had conceived. Only drunks would start by postulating an unfueled, massless wagon that could keep up with the wind. And only a tribe of sloshed og'Sieth would try to build one during a festival. They were already calling the wagon a skreiwheel after the twelve tenuous long legs of the rock-skittering skrei, as if their device merited a permanent name.

11

A human who is consistently fair to his friends will find unexpected allies among his adversaries who will plant his kalothi beyond the bounds of its formal territory. A human who degrades his enemies in word and deed will also be seen to scorn and beat the wife he loves, insult his comrades, cheat his parents, commit treason against his clan, and listen to flattery with a warm feeling in his heart. Do not trust the man who is ruthless with your enemies for he will make a poor friend.

The lonepriest Rimi-rasi
to the Gathering That Honored God

Teenae's rage still rang in her head, an anger that came, she thought, from the frightening coolness with which her husband was facing someone else's death.

It was infuriating that he was winning the game to which she had secretly challenged him. Real life walked on more legs than a kolgame. Joesai had the experience while she had only the wisdom. He had the men and she had none. He had the eyes of a bee and she had merely two. It was intolerable. Rage drove her.

The hides of perhaps a dozen men hung about the shop as room partitions or in place of tapestries. Surfacing the low table that dominated the whole space was a quilt of leather designs and behind this table stood a multijointed mirror, man-high, with almost golden reflectivity, which was built to give one

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an image of oneself from many viewpoints.

Zeilar, the n'Orap tattooist, set his book aside, and she saw that his face was carved in an abstract symmetry that would make any effort to decode his current expression an almost impossible task. "Look around," he said comfortably.

The small hide of a woman attracted Teenae's attention when she recognized its delicate workmanship. Zeilar's hand. That's what she wanted. The cuts, the fine work, the control of the scar tissue texture, the embossing, and the final tattooing were unbelievable.

"Not for sale," said Zeilar, noting her interest. "She's my oldest niece. I had her skin to work with since she was a child and she inspired me, the saucy wench. She was drowned by the Njarae."

"I'm not here for leather." Teenae dismissed the notion, saddened that a woman had lost her life to the sea in the fullness of her youth. "It's for me."

"Ah yes?" The face was indecipherable but the voice carried pleasure. "What design do you wish?"

Zeilar had scarred his son with the symbol of heresy. Joesai would not have approved. Since a child he had been adamant that no one's symbol should ever be carved into his body. The designs he wore were meaningless. Teenae knew exactly how to reach Joesai's complacence! "I wish some form of the four wheat kernels."

Zeilar's motions froze. "You are a convert to the teachings of our Oelita?"

"Yes," she lied with her gentlest voice.

The son appeared up the ladder with tea, followed by his tiny naked sister. The tea was poured for the shop's guest into shallow o'ca bowls.

"Do you wish this sacrament done now or with friends?"

"Now. You are my friends for you follow Oelita."

"Son, hurry and fetch some maita from my satchel to freshen our guest's tea." He turned to Teenae. "I prescribe only a mild narcotic since awareness of the pain brings faster healing."

Teenae was an o'Tghalie before she was Kaiel. "It is not logical to fear pain. It is only logical to fear the damage that generates pain. The symbol is not its referent. So my fathers taught me." She went to the mirror and disrobed. An infinity of golden Teenaes formed ranks in that geometric never-world. "My lower back is still that of a child," she said.

The boy re-emerged from the trap door with the maita leaf, followed by an eruption of sisters and another brother. For these young ones it was an event to watch the master work his magic with brush and knife and flesh. Each child made his presence unobtrusive. None let his eyes stray from Teenae.

Zeilar swabbed and cleaned her back with alcohol and then began to sketch on the skin while she stood inside the mirrors and watched this new flattery take shape upon her crowded body.

Teenae's mind was relishing the ironies all about her. She never really understood the way in which the non-o'Tghalie staggered blindly past, and over, the contradictions of their private worlds. Zeilar worked in a room that was a showplace to cannibal feasting, creating the symbol of a philosophy that denied

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cannibalism upon the back of a woman who would one day be eaten.

Slowly the essence of maita leaf saturated the tea. The boy brought it for Teenae to drink, lifting the bowl to her lips. She sipped. For a moment the artist paused, then brushed in some finishing lines. He stood back for her approval and she saw a hundred golden Teenaes with their backs to her and their heads turned. All of them nodded. The design had been modified to flow with the form of the prior cicatrices; the wheat stem was bent, as if caught by the wind while ripening on the round hills of her buttocks.

"Is Oelita as warm as she sounds?" Teenae took her place on the table, stomach down, face resting in her arms, smiling at the littlest girl.

Zeilar brought Teenae rods to grip in her fists and a strip of hardwood on a finger-high stand so that she might bite or leave it, as she wished. "Our Oelita has a golden kalothi. You and your husband are the ones who know gold. Life beats her in hammer strokes but she never breaks. A little bit of her is enough to gild everything with luster." He selected a knife, and adjusted a mirror to get a better light from the window where the peaked roofs of the village thrust upward to obscure the sea. "Are you ready?"

"So many people seem to worship her."

"Oh yes," said the artist, making his first swift cut.

Teenae gasped and clamped her teeth on the hardwood, breathing with deep breaths as the knife opened up more lines of blood. "Wait! God, wait!"

He indulged her but used the time to expose the design again by washing away the blood with a light solution of numbing maita tea. "I'll be trimming next. The pain will be intermittent but sharp."

"Has she been here long? Did you notice her as a child?"

"This will hurt." Snip. "She came and went with her father."

Snip, snip. "Those times when he brought her to the village she would run far ahead of him." Stab, snip, stab. "I remember the time when she crawled upstairs and sat down to supper with us." Slice, snip, stab. "She chattered our ears off. How's it going?"

"Just get it over with!"

He laughed. "We can't hurry or I'll slip. I'm going to cauterize some points and put a mashed beetle salve on other spots. That gives a different texturing effect. The salve will sting worse than the fire."

Teenae's body was trembling. "All right." She breathed deeply to stay out of shock, smelling her own flesh burning from the hot needle.

"'S all right," said the little girl, patting her on the head.

"Was Oelita a temple-goer?"

"Oh, she was at our temple all the time!" He began to cut again, and Teenae's body shuddered once. His deep voice dominated her senses, flooding over the pain like maita. *Concentrate on the voice*. The voice droned in and out as if the speaker were not in one place. "She competed in everything. She raced." An endless scream traced its path down to the hump of Teenae's buttocks. "Oelita played chess. Her eyes were the quickest, her hand the fastest. She'd spend days with a puzzle.

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She's the village kolgame master, though you'd never know it. . . ."

Teenae took her teeth off the hardwood strip long enough to interrupt. "I love kolgame!"

". . . because no matter whom she plays, she contrives to win only half the time!" Zeilar's hand sought a different knife and that brief moment of relief was spring and summer and autumn. "Nobody ever earned a higher kalothi rating in this village." A knife began quick maneuverings. "She does not need to be merciful," he said proudly, "but she is."

"Wait! I have to wait!"

"We are almost done. I think it will be beautiful." Tenderly he mopped up the blood and applied more stinging beetle mash.

"When did she become a lonepriest?"

"Doesn't wisdom come on us in hard times? Life was full for her. She had a great father, may he still nourish us, and all the friends a human could hope for. She could have married into a great clan. She could have had any clan, except perhaps your o'Tghalie."

"Our men would have loved her!" Teenae laughed.

"Are you ready yet? Shall we continue?"

"Yes, but keep talking. The knife is bearable when you talk and I can concentrate on your voice."

"She could have joined a Stgal family!" The knife began again with a torturing zig-zag walk. "Even the Kaiel would have had her, I'm sure of it. The Kaiel! But it was not to be." The knife paused while he shrugged.

"She took a lover. A great traveller. Handsome. Powerful kalothi. She was young then. Very young, and wished to prove to the world her worth as a bride by bearing the most beautiful children in the village. She had twins, both of them genetic cripples, nothing wrong in their minds—they were both alert and intelligent children like their mother—but crippled in the legs. You know the disease, Ainokie's Symptom. She's a carrier and never would have known had she picked another lover."

"She didn't devour them at birth?" asked Teenae, so appalled that for a moment her pain vanished.

"No. She has a gentle soul. She raised and protected them but would not marry. They had kalothi. She always said that. They had kalothi. But the famine came." The thought seemed to disturb him and he began to carve the kernels of the wheat in silence.

Teenae cried in gasps, "Go on with your story. Don't stop!"

"It was a bad famine here. The Culling began. First the criminals. The famine gnawed at our bellies. The low in kalothi went to the temple to give us life. Even the old went to the temple to give the young life—that's how bad it was. One out of every ten became part of the living. The village shared Oelita's children. That was when she stopped chanting to the God of the Sky, our rock of superstition, and when she began to show us a better way."

How cruel to keep monsters alive in the name of mercy, thought Teenae through her pain.

The artwork continued. The story continued. Teenae ceased to be aware of either. She endured the pain. She struggled to stay conscious. She breathed deeply. She tried to crush the rods in

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her fists. She left teethmarks on the hardwood bit. Sometimes she screamed through clenched teeth. Somewhere in her mind she thanked the God of the Sky that she was a woman now, a full-grown woman because there was no more blankness upon her body.

Zeilar swabbed the wounds gently and bandaged them. Two of his wives came up the ladder. They had been preparing a treat for her. Pain sharpened the taste buds, they said, and now was the time for delicacies.

"You're spoiling me," she said when the women began to sponge the sweat from her face and body.

"We welcome you to our bond," said the younger woman.

Teenae had saved her most important question until exactly the logical moment. "Will I ever get to meet her?"

"Yes," said one-wife.

"Of course," said three-wife.

"She is hiding now," said Zeilar, "because the Mnankrei have challenged her by Death Rite."

"I'd heard a rumor like that. It frightened me."

"Oh, but she welcomes the challenge. When the Mnankrei lose they will owe her a Great Favor."

Yes, you will owe her a Great Favor. Teenae savored the coming victory over Joesai. Logic was better than tradition.

12

Do not force upon others your forebearance toward the weak but do speak bravely. There will be times when braveness is stylish and there will be times when only the brave will dare braveness.

The Gentle Heretic
in "Sayings of a Rule Breaker"

Men were outside, guarding the modest house that stood on the highlands overlooking Sorrow's Temple in an area of difficult streets and stairways and cobblestoned back alleys. Apparently there was no front entrance and so the boy took Teenae to Oelita via the back, down stone stairs to a room that faced the sea through leaded window panes of bubbly green glass.

Oelita was standing. Her eyes met Teenae with such open clarity that Teenae feared she knew everything. Those wounded wrists!

"Where did you get such a beautiful gown?" she blurted to hide her fear.

"A friend. The oz'Numae weave them in one piece."

"Then it indeed comes from far! Where Scowlmoon is on the *eastern* horizon! A long overland trip!"

"You are a stranger to Sorrow," said Oelita. "You've come from afar yourself."

"Who on Geta is a stranger to sorrow? Really, you're not a stranger to me. I read your 'Sayings of a Rule Breaker' long ago," she lied.

"Zeilar gom-n'Orap tells me you wish to publish a small edition of that book."

Ah, thought Teenae, hearing eagerness. She reached into a pocket for a fine book on kolgame strategy printed in Kaiel-hontokae. Bait. "This is an example of our craftsmanship."

"Beautiful," said Oelita enviously,

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turning the pages, fingering the needlework of the binding.

"It would please me to print your works," continued Teenae.

"I've been thinking on this matter all night, ever since Zeilar carried the good news of your interest to my attention. But we'll discuss business later when we know each other better. Are you in the mood for a game?"

"Kolgame?"

The holy woman smiled. "I'm a kolgame master. You'll have a hard time. Perhaps chess?"

"Kolgame."

Teenae watched the game for clues to Oelita's character from the moment they threw dice to assemble the many shaped blocks of the game's territory. A pattern emerged. The heretic seemed to take over territory only to stabilize her food supply so that the Culling condition would occur less frequently. Teenae countered by occupying key command centers. Surprisingly, Oelita shared the burden of the inevitable impasse conditions among her tenants so that it was hard to eat them, but it was always better to load your weaknesses onto one tenant and grant suicide. Oelita could have won had she been willing to sacrifice more often but she would cede control rather than lose a tenant and so Teenae's o'Tghalie mind ruthlessly annihilated her by playing on that one weakness.

And Teenae knew then that the Kaiel could conquer her. Threaten someone's life and Oelita would be set against herself. She was neither willing to kill to save a life nor willing to stand aside while that life was taken.

Oelita's softness reminded Teenae of the teachings of the kembri-Itraiel. Those who are not willing to kill make tempting victims and thus have chosen endless conflict, while those who *are* willing and able to kill may always *choose* a peaceful life. Whosoever values his life will become enmeshed in the game of saving his life.

"You have a merciless soul," said Oelita, conceding defeat with a smile.

"Only when I play kol. Otherwise I'm very tenderhearted."

Oelita cooked dinner over a small ember fire in the central stove of her room. She chatted happily with her new friend about the outside world and books. Teenae noticed that every mention of the Kaiel made her wary.

"You've never been to Kaiel-hontokae, have you?" she said, probing.

"I wouldn't dare. The Kaiel priests would try me for heresy. I wouldn't be good for them anyway; I'd make a tough Judgment Feast."

"They're not like that!"

"They're so sure they are right, so sure of their destiny!"

"But a person who is sure that he is right feels no need to persecute," said Teenae gently. "It is only those who are *not* sure that they are right who have a need to harass heretics."

"So you think it would be safe?"

"Kaiel-hontokae is the one city on all of Geta where there is no fear of dissent."

"But they are bloodthirsty! They eat children!"

"The Stgal ate your children and you have courage enough to preach to them," said Teenae logically.

Oelita winced. "Pouring oil on your-

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self and striking a flint to illuminate the darkness of a strange city is a futile gesture."

"I know Kaiel-hontokae. I would guarantee your safety."

"I should go," Oelita thought pensively. She was recalling how much trouble her foolish rage against the Kaiel at Nonoep's farm had already cost her.

"You have influence here. The Kaiel are hungry for influence in this region, as you well know. They would bargain with you."

"What could they offer me? Would they stop their butchering of helpless babies?" she asked bitterly.

"They could offer you time, protection. How long will the Stgal last? It's a changing world."

"I'll sleep on it. You'll tell me more about your mysterious city. We hear only the wildest rumors."

The smell of the food attracted curious children from the neighborhood. Once inside they played with Teenae and crawled all over Oelita. She finally shooed them away but at the door was greeted by a noseless man who had chosen that moment to return one of her pamphlets. The two women talked with him for awhile, debating theological points, and then he left.

"You're so at ease with criminals."

"He's harmless!" exclaimed Oelita impatiently. "He stole a loaf of bread from the first harvest after the last famine. A loaf of bread! Have you ever seen a dangerous criminal? The dangerous ones make their Contribution-to-the-Race in a hurry!"

"He loves you. You give him hope," Teenae retreated.

"He needs hope, poor boy. Will you have broth with your meal? It's profane but harmless. I'm careful that way."

"A small cup."

Idly the discussion came back to printing Oelita's manuscripts. She was eager and trying not to show it. There were other books she considered more important than "Sayings." She left her cooking to fetch her newest work from a messy pile and in her excitement to show Teenae the pages she almost toppled her insect boxes with a brisk swing of her arm.

"It's such a clutter here. I've just moved and I have less space."

"You have quite an insect collection."

"My father's."

Teenae examined the fine dissection kit and microscope that had been used to draw and classify the insects. It sat beside a rock collection.

"Is this glass?" Teenae was so startled by one of the stones that she forgot the manuscript in her hands.

"It's too hard for glass! And it is the wrong crystalline shape for a diamond. I don't think a diamond ever grows that large."

"Where did you get it?"

"I collected stones as a child. That one I found while swimming. It was just there in the sea overgrown with weed and I took it."

"The sea?"

"My father taught me to swim. It's not dangerous."

"Joesai says such crystals contain the Frozen Voice of God."

"If we put it on the fire will God come out by the hearth and tell us stories?" chided Oelita.

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"He talks about genes," said Teenae defensively.

"Like a priest when he's drunk on whisky? We're such a superstitious people!" the Gentle Heretic raved. "There is a rational explanation for everything. We could chant that God brought the insects—but you can trace how they changed to meet challenge until they fill every niche where life can exist. My father found life in the driest desert! He found, embedded in stones, the shells of insects that don't even exist today. Do you know how long it would take for that kind of stone to form from clay soft enough to trap an insect? Eons! And the Chants say that the Race just appeared here in a puff of smoke at noon practically yesterday!"

"There are no human fossils."

"We make soup out of bones!" exclaimed Oelita, setting a meal before her guest, beside her newest manuscript.

"*My* family *collects* bones."

"We'll find human fossils. You'll see. No one has ever looked! And they haven't looked because they haven't dared! And we *have* found bone tools."

"Recent ones."

"Teenae! We've only been a tool-making insect recently. There weren't many of us before. It's been a rapid evolution."

"Because we *ate* the less intelligent ones." Teenae had wanted to bring up this contradiction in Oelita's philosophy. Oelita condemned cannibalism while claiming that the vitality of the Race derived from cannibalism.

"Yes," came the defiant answer, "because we *ate* the less intelligent ones! People always get me wrong. They say I don't believe we should follow the path of kalothi. I believe in kalothi! It created us out of insects and it is our destiny. We haven't stopped evolving and I don't want us to stop evolving. But we don't have to *eat* each other to evolve! There are other ways. *I* can think of other ways."

A long pause ensued while a thoughtful Teenae nourished herself. "What ways would you suggest?"

"If we women got together and only had our children by men of great kalothi, that would be one way. Those of us, like me, who have defective genes can decide not to breed. That's another way."

They argued while they ate, but Teenae never tried to win. Oelita's ignorance in too many fields was too appalling to make it worthwhile to argue logically. She was an ignorant, unsophisticated, self-educated country girl. Teenae liked her but was rather horrified at the thought of being married to her. Aesoe was a mad dreamer. When she had Oelita in Kaiel-hontokae she would convince Aesoe that there was a better way than marriage.

Oh Kathein, I love you so!

The sun was long gone before the two women were talked out. They cleaned up from the meal. Teenae read part of the new manuscript. She accepted a small gift from Oelita and gave one in return, exacting with it the promise that they would meet again.

"Soon!"

"Soon," smiled Oelita.

Crashing waves raised by the wind brought salt spray all across the village. The blackness was full, for Scowlmoon was dark at sunset. Only the starlight illuminated Teenae's pathway home.

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She was going to relish her triumph over Joesai. She had begun the first steps in a real negotiation and she felt elated!

Fingers took her from behind over the mouth, muffling her protests while two other men clamped vise-like grips upon her fiercely struggling body.

13

In his lifetime a man will pace over all the stones in the river, the large ones and the small ones, the flat ones and the slimy ones. The stone he misperceives will kill him. The merciless man does not see mercy and so when he needs mercy his feet cannot find it. The man too proud to show his mistakes makes a fool of himself missing his jump. The man who lives in dangerous waters and leaps nimbly from suspicion to suspicion will be unable to cross the river because he will not trust the solid stones.

Foeti pno-Kaiel, creche teacher
of the maran-Kaiel

Joesai was worried, yet not ready to worry seriously. He had Teenae's note and he was angry at her for slipping out of his protection in the town where two Kaiel families had been murdered, but she hadn't promised to be back before dawn and Getasun was only one diameter above the horizon. Noe, bless her, would not have gone without consulting everybody, but Teenae was Teenae. She liked secrets. Five of his men watched for her quietly.

Damn! I'll spank her bare wheatcakes when I catch her. Restless, he left the inn and paced up the long quay. *If they've hurt her I'll hang their screaming skinless bodies for the bees to hive on.*

He turned and saw his Eiemeni approaching along the granite with Oelita and four of her fierce men. The way of their walk was foreboding. They were in a hurry. Her robes flapped in the sea breeze.

It was going to be news about his wife. In a flash he suspected that Oelita had met his deception with a deadly counter deception. "Teenae!" he hissed as he quenched his anger and poised himself with a tempered soul, ready for anything, emotionless.

"The Mnankrei have your wife! It's my fault!" Oelita's voice was stricken.

Was she paying off Joesai in the coin of some grisly joke? "Explain yourself."

"Your wife left my place and four thugs took her. Two of my guards, who had been following her for protection, tried to interfere." A tall, deeply scarred man bowed. Oelita went on breathlessly, "I don't know why they took her. Perhaps they thought she was me."

"You think them the same as those who challenged you with Death Rite?" he asked without letting his face show a flicker of disbelief.

"The Mnankrei? Yes. I don't understand them," she said.

Now there was a bluff for a temple's game table! *What is your price!* "Where is she now?"

"On their ship. It arrived yesterday, warning of famine to the south."

Joesai nodded to Eiemeni and his youth left on the run. Oelita's face was compassion. She seemed to be able to lie as well as he lied. He dared not

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openly voice his suspicion of her for fear of walking into a trap Oelita had set for him. His respect for her deviousness increased enormously. Not content to organize a defense against attack, she was returning the attack ruthlessly. "I love that woman," he said darkly, locking his eyes with the heretic's. "Whosoever harms her, I shall destroy."

Oelita touched his arm. Her treacherous sympathy enraged him.

"Why was she with you?" he asked.

"We were discussing a publication scheme I've had in mind for awhile."

He cursed himself. All the time he had spent with Oelita escorting her back to Sorrow along the coast, she had known who he was and was plumbing him for weaknesses, preparing her counteroffensive. But there was nothing he could do but pretend innocence while she pretended innocence. "I want her back," he said.

"They're still here."

"Who?"

"The Mnankrei." She pointed impatiently. "Their ship."

He had to grant her a chagrined smile. She constructed her story well. A Mnankrei freighter was indeed at anchor far out in the bay, its sails furled. "What do you suppose *they* want of her?" he said with muted sarcasm. "Ransom?"

She stared at the ship with hatred. "What do you suppose they want of *me?* I will get her back. I have a score to even with them."

"Brutal words from the mouth of the Gentle Heretic."

"There are ways to even scores without being brutal, my chitin-hearted man! Watch me! I am not powerless. They think to use your wife to trap me. I will trap them!"

Eiemeni trotted back along the quay. "She *is* held in yonder ship."

For the first time Joesai looked out at the ship with alarm. He explored different theories. If Oelita had an alliance with the Mnankrei then the deception of the Mnankrei Death Rite would have been transparent from the beginning. But if there was such an alliance then Oelita was truly dangerous and rescuing Teenae would pose grave risk and might not even be possible. *I will be forced to negotiate with Oelita.*

She left, promising to be back. Joesai gathered the key stategists of his group at the inn for a game council. Finally one of Joesai's scouts returned with a grin. He had boarded the Mnankrei ship as a "port inspector" and indeed had caught a glance of Teenae below decks while pretending to check harbor regulations.

That was all Joesai needed. "We'll sink the ship," he said.

14

The purple Njarae is the breeder of our ability. Does she not drown the careless sailor?

Proverb of the Mnankrei

Sea priest Tonpa, Storm Master, sat in his carved chair, long hair braided into his beard, his face scarred with the flying-storm-wave design, examining Teenae, who stood naked, ankles manacled, wrists manacled in brass chain, holding her head high, guarded by two erect seamen.

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Tonpa could see in the quivering of her mouth that she was not taking her humiliation well. She was being silent to hide her near-tearful state. These Kaiel, who watered down their stock with the genes of the underclans, were all bluff.

"This port is an out-of-the-way call on our return," he said severely, "but we think of it as our sacred obligation to warn of the plague that brings famine to the Stgal communities below, for it must come here as the wheat ripens. And what greets us? Lies!"

He waited for her reply. She did not reply but stood rigidly stiff as if disgusted by the ship-smell of ripe sea creatures.

"We hear of an act perpetrated against one of the most respected women of this community. True, she is a heretic. True, she speaks foolishness—but she does not lie. So who is the source of these lies? The innocent folk who live here are willing to listen to lies about the Mnankrei just as they are willing to listen to lies about the Kaiel, so they look no farther for truth. But we *are* the Mnankrei and so we look for the source of these vicious lies.

"Are not the Kaiel known for their devious ways and their arrogance? The kaiel insect spreads false scent so it can control. The priest insects who have usurped this name spread calumny for the same purpose. But the salt spray that clears the nose gives us immunity from such ensnarement.

"Was it hard to find you? It took a day. You stand on *my* deck against your will, shaved of your dignity, in fetters. Our spies are more brilliant than your spies." He paused and cleaned his fingernails with the point of his knife. "A Kaiel posing as an o'Tghalie. True Kaiel deception."

To abate the adrenalin terror, the manacled woman clenched her fists and breathed heavily, breasts rising and falling with her chest, but she would not reply.

Tonpa flipped his knife and it sank into the deck, vibrating. One of the seamen recovered the thin weapon, returning it with a bow. The Storm Master never took his eyes off Teenae. He accepted a mug of warm broth from a boy who emerged up a ladder and still he did not unlock his nude victim from the brig of his gaze.

"This woman you wish dead, whom you have so cowardly attacked in the name of the Mnankrei, was reluctant to come aboard until I offered hostages. You must face her." Teenae's flinch amused him. "She does not know the truth." He watched Teenae shrink. "I do." He watched his captive turn her head away. "I give you a choice. You may face her and keep silent and make your Contribution through Ritual Suicide to the larder of this ship or you may speak the truth and escape with only your nose being cut from your face for the crime of slander. Speak!"

Teenae was glaring at him with loathing. Tonpa shrugged, deliberately feigning indifference. "It's been a long voyage. Be stubborn. The men will not object to the taste of fresh meat." He watched her eyes dart between her two grinning guards. Her hatred crumbled to grief.

"I will speak the truth to Oelita—but not for my life."

"Because you are honorable, of

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course." He couldn't resist that last whiplash. A gesture told the guards to take her away.

Tonpa followed them down to the lower deck but his ever-alert eyes caught the stare of one of his sailors as the prisoner was escorted past him. Arap was a big boy, bigger than Tonpa; he had no more than fuzz for a beard but he was precocious with the women, a jolly soul who could convince a matron twice his age that she was young again, and never failed to try.

"What a waste!" Arap sighed to his master, his hand gesturing in open grip as if he would take heaven by her round buttocks.

"Nothing is to be wasted," replied Tonpa. "Every finger of her is lean meat."

"Storm Master, sir! How c'd you? A comely girl like that-un? Leave me have the appetizer. You c'n have the steak."

"She'd scratch your eyes out!"

"Not me, sir!"

"Follow me," said Tonpa abruptly.

Arap whitened. "Sir, if I've offended you . . ."

"You have not offended me." The Mnankrei priest brought Arap of the lesser clans into his luxurious cabin and set him down in the velvet seat by the desk, amused at the boy's discomfort.

"Shall I give the wench into your hands?" Tonpa teased.

Arap was sweating. "We c'd all have a go at her, sir. Perhaps I c'd train her up not to fight too hard." The sailor was growing appalled at his position. It was a trap and whatever he said was coming out wrong. A horrible suspicion was dawning. Their master was known to lead by the ear. "Sir, you're not liable to assign me to butcher her? Really, sir, I lack skill in such art."

"You think of me in harsh terms, Arap."

"No, sir."

"I'm assigning you to guard this Teenae. The first watch you will only smile at her and do her silent favors of the smallest kind. Other seamen will discuss recipes with her in a somewhat bawdy way. When she is sufficiently terrorized, you will become very tender with her. Appear infatuated to the extent that you are willing to risk your life for her. Tell her your jokes about me; the one about how I bail a boat will do nicely," he added wryly.

Arap was near to fainting.

"See that she knows you consider me to be a monster. Tell her our plans, exactly as they have been told to you."

"But, sir . . ."

"Then help her to escape."

"Sir, I've b'n set with the party to row ashore and burn the silos."

"I know."

"I'm to spill *that* in her ear?"

"That's what I said."

"And I'm to take my way with her?"

"If you're clever. In any event she is to escape."

Smells in the dark cubicle where Teenae was chained sifted through the air and she could hardly see the man-boy who brought her food. He was the one who had been kind to her when the cook and his assistants were down making ribald jokes in very bad taste. She didn't want to eat now but if only she could get those chains unlocked for a

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few moments! "Please, if you take the chains off I can eat."

He would not do that, but he sat down beside her and fed her the gruel carefully. "Don't be afraid of old Lace Beard. He never does much more'n keelhaul a man. Can't stomach killin' even if it means a good meal. 'Course the men've b'n complainin' 'bout the food and sometimes he gotta keep the peace."

She backed away as far as the chains would let her.

"Don't worry. He's goin' to let you go."

"Without my nose!" she sobbed.

"It's a pretty nose. Maybe he'll let me keep it for a souvenir."

Teenae spat gruel at him but became infected by the great laugh, as he had wanted her to.

"What'd he say to you?" asked the boy. "A mean wind he is. He struts 'round on deck and makes pious sayin's at us like as if we don't 've enough with settin' and riggin'."

"He told me the Kaiel are rotten liars and Mnankrei are saints," she laughed.

Arap glanced over his shoulder furtively. "Us underclan folk get to see the rope-deck. Saints. I'll tell you. Do my soul a favor for the poor folk of Sorrow. You're gettin' off the ship and you c'n warn 'em. Next midnight we're to shore and burnin' the granary on the peninsula, so's we c'n tack 'round and sell 'em wheat. That's what we're here for. Keelhaul the Stgal. Old Lace Beard can't kill a tender meal like you, but he c'n starve a thousand without sheddin' a tear."

She started to comment, and he slammed a hand over her mouth. "You want 'em to serve me for soup? Now how 'bout a little kiss 'fore I go?" He put his arm around her.

"Don't you touch me."

"What a silly pout for a chained-up girl to say." He kissed her and it was the kiss of a large boy who had been too long away from home and was hungry to be tender to a woman.

"When is Oelita coming aboard?" asked Teenae.

"It's all set for after sunup."

"And when is Tonpa going to chop off my nose?"

"Soon as the woman leaves."

"Why don't you take off my manacles?"

"You're thinkin' escape," he grinned.

"I'm thinking about my nose!"

"I'd be skinned and rolled in salt, was I to unfetter you."

"You could always run away with me."

A pale beam from Scowlmoon reflected off the brig wall, so faintly illuminating her legs that the scarified design of them was invisible, leaving only the shape of legs like those of a young child. He felt his lust rouse. Excited fingers worked with the locks around her ankles. "I sh'dn't be doin' this," he said hollowly.

"The wrists, too," she replied.

"No," he said.

He put his arm around her as gently as he could and with all the care his hand knew, caressed her. Slowly he won her body, while he restlessly suppressed the surf of his own desire. Once, with a barely perceptible motion, she snuggled up to him. Triumph welled in the sailor.

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"You smell funny," she said clinically.

Ashamed, he remembered that he hadn't bathed. He moved away.

"Don't go away," she said, alarmed.

But he left in panic and found another part of the ship where he could wash himself in salt water. He scrubbed the important parts of him until they were red. Then he came back with some old blankets so that she could have a pillow and found her struggling with the hand manacles. She was crying.

"You came back," she said petulantly.

"I got blankets to make you more comfy." And he put the blankets on the deck and molded her into them.

"How can I hold you if you don't take off these damn hand manacles!" There was a thread of anger in her voice.

He hurried to unlock them, and she held him and they maneuvered for a less awkward position and he held her tightly while his lust commanded him because he was afraid that she might run away too soon. "What're you thinkin' 'bout, babe?"

"About my nose," she said quietly.

She listened carefully as he told her how to escape. She had to wait until he was off-watch. Then she had to count the next guard's pacing. When he had passed the fourth time she was to count to fifty and then throw off her still-unlocked shackles and push open the porthole, which Arap would have unlocked, and then jump into the sea and swim ashore.

The time came. She counted to fifty by the thumping of her heart and made for the tiny hole in the side of the ship and slithered out, hanging for a moment by her fingertips before she dropped feet first into the moonlit bay. She had never swum before in water over her head, nor in anything bigger than a river pool. It did not matter. She was ready to fly if she had to.

The saltwater closed around her head and she bobbed to the surface, hearing cries from the upper deck. Her plunge had been seen. For one heartbeat she felt what it must have been like for her husbands to grow up in their creche, outwitting the death trials. Terror and hope. Then her o'Tghalie mind took over. This is what she had been bred for. This was a problem. Without even knowing how she did it, her body created a powerful swimming stroke that pulled her through the water at minimal energy cost.

15

Note how the large maelot is captured by a true sea master. We do not deck this creature with the first haul. The maelot is strong and the line is fragile. Let the four-legger escape until it has lost all hope. Then it is weaker than the line.

Mnankrei Time Wizard e'Nop
of the Temple of Raging Seas

Storm Master Tonpa was waiting in a skiff behind his ship when the cry came. He could have overtaken her easily but he did not. He kept his oarsmen far enough behind her so that she had hope, but moved them fast enough in pursuit so that her desperate hope would exhaust her.

When he finally took her, Teenae

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raked him with her claws and his crewmen had to tie her feet while he held her. They fastened the line so that she was hauled behind the boat, face down. She had to struggle frantically for air. Tonpa gave careful visual attention to the vigor of these splashings. Teenae was reeled aboard ship by her bound feet, recklessly swung against the hull by the cavalier sailors, and left to hang until Tonpa himself had climbed aboard in his own good time.

The sea priest did not bother to speak to her. He ignored his clawed face. Callously he supervised his men while they lashed her into the painful four-quarter rigging, as if her limbs were the four corners of a sail replacing the furled fore-topsail. Up there her husband would be sure to see her at dawn, upside down, silhouetted, perhaps even rosily outlined.

Arap was also lashed to the rigging, but right side up, and lower down. Tonpa told Arap that pleasure set better in the memory when it was framed by pain. And then he laughed. "How else do I convince her to convince her husband that what you told her was whole truth?"

As an extra precaution he moved his ship out of the bay, silently and without running lights, to foil whatever rescue efforts her husband might attempt. There would be no need for a rescue. At dawn they would be back and what was left of her would be returned to her man.

At the fading of the stars, when Getasun was only peeking at the Njarae from behind the mountains, two rough seamen lowered Teenae and slopped salt water on her crumpled body to revive her. They towelled her down, joking cruelly. A taciturn sailor shaved the strip at the top of her head. They fed her. All the while she said nothing. For a long time she was kept below deck, and then they took her up, unclothed, to face Oelita. She would rather have died on the mast. Not only was Oelita there, but many of the townspeople she knew as well. Oelita, in disbelief, made her say what she had to say over and over again. That was a special torture.

Finally Oelita turned to Tonpa and asked with a precise electric force, "Is she speaking under duress? Are you forcing her to say this?"

"Yes, she is speaking under duress. Can you imagine this Truth to be pleasant for her? She speaks Truth under penalty of death."

"She seems to be ill treated."

"I have been under no obligation to treat her well."

"What will happen to her?"

"She loses her nose for slandering the Mnankrei and then we give her to you to do as you please."

"You will not harm her in any way or I will slander the Mnankrei in ways you cannot imagine!"

The sea priest chuckled. "Ah, the Gentle Heretic who forgives her worst enemy. Flowers for the criminal. So be it." He bowed. "We've been wronged, but yours is the graver wrong."

"May I speak with her alone to see that she is not speaking what torture has commanded her to speak?"

"Of course."

On the deck away from everyone, Oelita placed a shawl around Teenae's shoulders to protect her from the sea chill. "Why? Tell me why?"

Teenae shook her head.

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"Why!" Oelita insisted with a storm's force.

"We were proposing to you," she said in the tiniest of sounds while looking at the deck.

"You were what?" Lack of understanding made Oelita's voice antagonistic.

"Proposing marriage."

Oelita stared.

Teenae was in a state of shock. "There are five of us. We need a sixth."

Finally the calm wonder with which one treats the truly insane mellowed the Heretic of Sorrow. "Is that a Kaiel custom, to murder the bride?"

"If you survive, you're worthy."

"And you think I would be willing to present my grall after such a courtship?" The grall was the bride's gift, a layering of sacred and profane foods.

Teenae hung her head.

"Was this the way *you* were courted?"

"No," said Teenae with a wistful absence. Her mind hardly functioned. "Gaet and Hoemei and Joesai took me to the mountains. They sang songs. I was only a little girl." She was crying. "Don't you see? They didn't want you! They were ordered to marry you! We wanted Kathein." She sobbed. "It's too complicated. Joesai was the wrong man to send but they had to send him because all the Kaiel they've sent have been murdered and he's a violent man who is at home with murder and I was supposed to mute him and I didn't." Teenae spoke more but nothing that was comprehensible.

The older woman led the young one back to the Storm Master's stateroom. "We'll go now," she said, defying any of the Mnankrei to stop her. They let her go, her arm around Teenae's shoulders, having gotten what they wanted —witnesses to tell of Kaiel deceit and weakness.

Among a quiet group on the quay, Oelita reunited Joesai with his wife. "Thank you for this favor," he intoned stiffly.

"Am I glad to see you," muttered Teenae, hiding her nakedness in her husband's chest.

"I brought her back without killing anyone." Oelita was defiant.

Joesai laughed because he was so happy to have Teenae in his arms again. The laugh blazed as a forge does while it melts steel. "But imagine the violence that has been done to my pride." His fingers combed Teenae's long hair. "I'll have to kill them all."

"It is wrong to kill." Oelita said.

"No," he said.

"I have contempt for the traps you have laid for me. Both of you!"

"The next time we shall take more care to win your respect," he replied ironically.

"So! You're not going to leave me alone!"

"You read me that easily?"

"Yes! You are Kaiel, a creature of ritual! Ritual; that's the plague of Geta." She sounded frightened. "I'll survive you!"

He was grinning. "I don't recommend that. Then you'll have to marry me."

His arrogance possessed Oelita with a stormy mixture of rage and fear. "I'll poison the grall!" she said, not knowing what she was saying.

Joesai couldn't contain his laughter. With Teenae back, his fear was gone.

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"It's wrong to kill," he chided. All this time he was appraising the hostile crowd. He gestured his group into a defensive formation and they moved out.

Kaiel men surrounded Teenae, fast-pacing along the quay from the angry mob. Far across the bay, the Mnankrei ship blended darkly into the waves.

Only now, as Teenae was beginning to be aware that she was alive and even safe, did she have time for rage.

"That shipleech Tonpa, may his scars turn to pus! I'll never forgive him. Never." She felt her nose. It was still there. "Kill him for me, Joesai. You can do it. I want a new pair of boots!"

Joesai's mind was more on immediate survival. "First your feet will have to acquire a new set of calluses. Second you will have to row to the moon. Third . . ."

She was in no mood to be joshed. "Kill him for me tonight while my hatred is hot enough for me to enjoy it!"

Joesai laughed. "He's just lucky he didn't make the mistake of beating you at a game of kol!"

"You'll have your chance to kill him at lownode!"

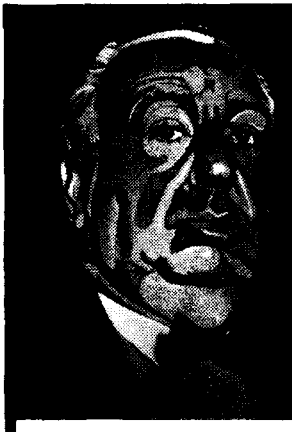
"Ho?"

"Cut his throat at lownode!"

"And what happens at midnight's halfmoon?" he asked cautiously.

"A Mnankrei party is going to come ashore and burn down the peninsula granary."

TO BE CONTINUED



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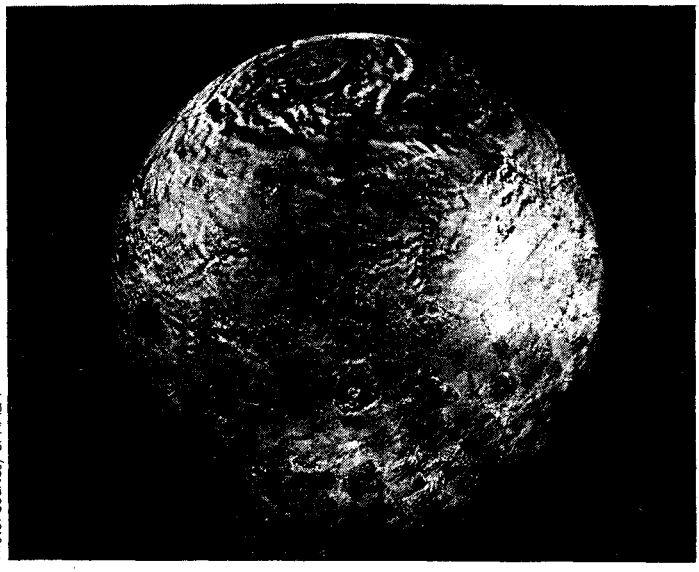

Photo: Courtesy of NASA

ONWARD TO MARS!

G. Harry Stine

"В Марс!"

("Onward to Mars!")

With these words, the Russian space pioneer Fridrkh Arturovich Tsander greeted his colleagues in Moscow every morning when he arrived at the offices of the Group for the Study of Reactive Motion (GIRD) before his death from typhus in 1933.

Today it's still the clarion cry of space scientists and advocates, because the Red Planet remains a highly visible goal for space flight—with growing possibilities not only for scientific study but also for commercial use. In spite of its smaller diameter, Mars has as much land area as Earth, because 73% of our world's surface area is covered with water.

Controversy over the Labeled Release Experiment of Viking hasn't settled the question of the presence or absence of life on Mars, so the Red Planet is also an extremely important research target.

A question can be legitimately asked, however: Do we really *want* to put a manned expedition on the surface of Mars, either temporarily or on a permanent basis, or are we constrained to

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establish manned facilities only in Mars orbit because of the possibilities of contaminating Mars? And since those basic questions arise, why consider a manned Mars program at all? Why not continue to send robot explorers like Viking?

Both Dr. Marvin Minsky of MIT and Dr. John McCarthy of Stanford University, the two top experts in the area of artificial intelligence and robotics, carefully point out to advocates of robotic exploration that the very best robots possible with the current and projected technology can be only preprogrammed machines with strictly limited self-programming functions. Dr. McCarthy built a robot that he felt was sophisticated enough to assemble a color television kit; he discovered that his robot couldn't even open the box. On the other hand, the field of teleoperators—robots remotely controlled by human operators—has progressed rapidly, but still faces serious problems when the time delay in the telecommand link becomes long.

Therefore, there appear to be three approaches to actual exploration of the surface of Mars: (a) people on site, (b) robot explorers like Viking with limited capabilities due to the long time delay in telecommand transmission between Earth and Mars, and (c) teleoperators on Mars with humans operating these devices from Mars orbit. The innate problems with the robot approach and the time delay mean that people will have to be in the Martian vicinity, either on the surface or in orbit.

Surprisingly, in spite of the apparent attractiveness of the planetoid belt for commercial operations, Mars is a logical goal for human space exploration for several reasons beyond the fact that the planet does present a visible and apparently attainable target. Placing humans in orbit around or on the surface of Mars and keeping a manned outpost there involves perhaps the ultimate "stretch" of current technology across a broad spectrum of know-how. And it will also involve the discovery and development of totally new technologies along the way.

Can it be done with current or projected technologies, however? And what are the options that are available to us? What technologies must we emphasize in the coming decade in order to have the know-how available? And what are the time-lines and schedules? How do we go to Mars?

> Rudyard Kipling once advised us:
> "There are nine and sixty ways
> Of writing tribal lays—
> And every single one of them
> is right!"

Although Kipling was not referring to a manned Mars operation, his words are apropos to carrying out such a program because there appear to be at least nine and sixty ways to get to Mars, *nearly all of which involve projected technologies which have not yet been tested and proved!* Therefore, although many proposals for a manned Mars program sound highly attractive, this important caveat must be kept firmly in mind.

Assuming then that we want to do it, how do we manage to put people in the Martian vicinity and keep them alive and working there?

The latter part of that question is answered if we can solve the first part,

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because if we can get people to Mars, the technology that allows this feat also permits people to live on or around Mars for as long as they wish.

Provided, of course, that the program is established as a sequential, stepwise, growth project that takes advantage of the growth of space industrialization. Otherwise, it will cost far too much to permit it to be financed by taxpayers or even space entrepreneurs.

The latter source of funding for a manned Mars program should not be summarily dismissed. For the past decade, there has been a growing awareness that space programs cannot reliably be planned and carried out if totally supported by tax monies, regardless of the long-range benefits that may accrue to the taxpayers as a result, because there are politics involved, annual budgetary fights, and somebody who wants to have that money spent on *his* pet project instead. On the other hand, if a space project appears to have *value* in terms of raw materials, products, or services that will eventually result in a return on investment, everybody wins and the project, regardless of the length of time and the difficulty of bringing it to fruition, gets accomplished.

But what might be of value to private enterprise on Mars?

We don't know yet because the data is still coming in. Most of the data has either confirmed or denied what the automated robots were sent there to look for. The raw materials of Mars are far from being catalogued. Even if they were, the question arises as to whether those materials would be more valuable to human activities on Earth or *in space*.

One must never fall prey to the shortsightedness of linear thinking. In this case, any scenario involving manned Mars operations must also include the factor of space industrialization progressing at the same time. The future never proceeds with only *one* factor progressing while others stand still; the future occurs with *all* areas progressing and evolving together in a huge synergistic system in which two plus two doesn't equal four but usually five and sometimes seven.

By the time we are able to mount a manned Mars operation technically and financially, the major market for Martian materials may be other human space activities themselves, *not* terrestrial activities. Mars has a relatively shallow gravity well compared to that of Earth. Therefore, it may be cheaper to haul raw materials up out of the Martian gravity well and across millions of kilometers of space than to attempt to haul similar materials up out of the deeper terrestrial gravity well, even though Earth may be closer in terms of distance to the ultimate user of the materials.

In the solar system, *distance* is not a factor except in terms of the *time* required for human travel within it because the time factor dictates the size, complexity, and design of life-support systems. The economics of the Solar System depend upon the *energy* required to move about in it. (It is slowly dawning upon us that much the same sort of energy economics operates on Earth as well, even though engineers have known it for years. That's why steel mills are located close to coal supplies rather than iron ore bodies; it takes more coal than iron ore to make steel. The converse holds true for copper; it

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takes more copper ore than electric power to smelt copper. Energy economics reign in private enterprise.)

There is neither time nor space here to consider "nine-and-sixty ways" of going to Mars. Let us therefore look at two widely different options instead; the final method(s)—there may be more than one actually used—may fall somewhere between the two extremes that will be discussed. Actually, the two options discussed here are only two intersections in a multi-dimensional matrix made up of propulsion technology, life-support technology, economics, and probable utility of Martian resources. If you don't like the two options discussed here, work out your own because it will be a learning experience in systems engineering combined with management of complex operations. It helps to have a knowledge of how and why both exploration and exploitation expeditions of the past and present on Earth succeeded or failed.

Keep in mind, however, that this discussion—for reasons that will later become apparent—does not involve the usually considered manned Mars mission of going there, looking around, and coming back to Earth. If we're going to do the Mars operation at all, we should plan on going there *to stay*, establishing a permanent manned presence in the Martian vicinity, and sending back data by telecommunications links but handling people quite differently in each case. Regardless of which of the two options we chose to pursue, we will have to establish an MTS (Mars Transportation System) with regularly scheduled manned voyages to the Martian vicinity.

Scenario One may be called the "classic" method of conducting a manned Mars operation—i.e., the major orbiting base and perhaps the Mars-surface base are sent out in one or two missions, established in full-blown operation from the start, and operated by regularly rotated groups of people.

Scenario Two is a "shoestring" method similar to the way in which the American, African, and Australian colonies were maintained by the European seafaring powers in the sixteenth, seventeenth, and eighteenth centuries—i.e., a slow, steady, planned build-up of facilities at the far end of the line with the people involved going out *to stay* as long as possible, coming back to Earth only if necessary.

Scenario One is the method usually considered for a manned Mars operation because it's strictly scientific in nature—conducting both long-term and short-term investigations with the investigators coming back with their data—and with no consideration of establishing a facility to eventually *use* whatever of value is found on Mars.

Scenario Two is analogous to sending out a colonization party with instructions to "live off the land," make the operation work, and produce. It is both scientific and pragmatic—scientific because if you don't do good science in the operation, you won't be able to produce anything of value. The cost may be less, but the risk is higher in terms of both financial and human values.

Scenario One produces information. Scenario Two produces information *plus* value returned if such exists.

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Scenario One is Apollo. Scenario Two is Skylab, Space Operations Center, Salyut, etc.

Scenario One may be closed-ended. Scenario Two may or may not be, depending upon what is learned and how well people perform.

Scenario One is based upon the problem "set" faced by many space planners today and was chosen to provide a contrast to Scenario Two, which hasn't been widely discussed and which depends upon breaking that mental "set" and trying to approach the solution to a permanent manned presence on or near Mars from a different point of departure.

Economics of the manned Mars operation practically dictate that the first milestone be the activation of a permanently manned low-Earth-orbit space station—such facilities now in the planning stage go by such names as Space Operations Center (SOC), Low Earth Orbit or LEO Base, Space Industrial Park, Star Base One, and so on. The Soviet Union already has a good start on this with Salyut-6 which, since its launch in 1977, has been in nearly continuous operation and must therefore be considered as a permanent space station. The docking of Cosmos 1,267 with Salyut-6 means that the Soviets already possess the capability for assembling large space structures from smaller Earth-launched modules. SOC or LEO Base is now within the reach of the United States with the space shuttles in operation. Estimates place an American LEO Base operational in the 1986-1992 time frame.

LEO Base is only one milestone. A manned Mars mission staged from LEO Base is much easier than one staged from the ground at Cape Canaveral. But it is still enormously expensive because everything must be brought to LEO base from the Earth's surface at great cost in energy. There are some other technologies that must be developed.

Either of the scenarios reaches a fork in the decision tree at the point sometime between 1986 and 1995, when LEO Base is established and fully operational. Major breakthroughs and profitability of space processing operations performed in LEO Base may greatly increase space traffic and require an increased use of raw materials. Or research, development, test, and engineering (RDT&E) on solar power satellites (SPS) indicates there are no "show stoppers" to the development of a full SPS system, but that it will indeed be four times cheaper to build SPS units from extraterrestrial materials obtained initially from the Moon. Either one of these developments greatly decreases the cost and increases the likelihood of an early commencement of the manned Mars operation.

If space processing turns out to be a chimera—which is highly unlikely—or if some form of solar power from space doesn't turn up to be economical—also unlikely—then the Mars operation is in deep trouble and must proceed along the classic lines of Scenario One, taking perhaps until 2030 or 2050 to become reality.

But an increased level of activity in space processing or the decision to go ahead with a Solar Power Satellite (SPS) system means the development of deep-space manned transportation technology that includes both propulsion and life

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support. Current planning for the deployment of a full SPS system envisions a LEO Staging Base of perhaps 200 people supporting a Geosynchronous Earth Orbit (GEO) Construction Base of 800 to 1000 people. Further hard data may show that it's cheaper to build SPS units from terrestrial materials to begin with, phasing over to lunar materials by, say, 2001. There is admittedly a lot of guesswork here at this time, even though the recent Department of Energy study on SPS showed there were no apparent "show stoppers." The guesswork comes with nailing down the actual numbers: the cost of building the system with terrestrial materials versus the cost, development time, and development costs of building the SPS system using lunar materials.

Either way, there will be a dramatic increase in space transportation capability coupled with a reduction in costs. There will also be technical progress in closed-cycle life support systems because, with 1000 people living in GEO Base building SPS units from either terrestrial or lunar materials, it's going to be cheaper and easier to develop the closed-cycle systems than to continue to use open systems that must be resupplied with consumables brought up from Earth.

(Caveat: Regardless of the level of technology reached in closed-cycle life support systems, there will *always* be gas losses because of incomplete scavenging of air lock operation and because pressurized space facilities *leak* and always have. There's no problem with replacing oxygen because this can be obtained from dissociation of water using solar energy, and there's always plenty of water in a manned facility because water is a product of human metabolism. The *big* problem involves the replacement of nitrogen, which isn't available in any of the lunar rocks that have been studied to date and which apparently can be obtained only from Earth *or from Mars.)*

Closed-cycle life support systems have been built in laboratories on Earth, and their development goes back to the 1950s. But laboratory operation is a far cry from actual on-site operation in weightlessness, where human lives depend upon the system. Getting the lab system to work is *easy* compared to the gut-tearing engineering job of *making* the operational system work. It takes longer, too, which is an indication that, if we're going to need such systems as it appears we will, somebody had better get started on operational models *now*. Since every permanently manned space facility and long-flight space ship is going to need such a system, the company that gets it on the market at the right time later in this decade will make a few coins in the process. Furthermore, this is something that doesn't have to be tackled by Exxon, General Motors, or one of the Fortune-500 companies; it's the sort of thing that's amenable to classic American private enterprise, where a group of people mortgage everything they've got, set up shop in a garage, and end up a decade later as millionaires.

And the scientific spin-off from this one development alone could affect lifestyles on Earth as well, because if it will work in space, it will work in homes, office buildings, factories, mines, undersea facilities, and other locales on

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Earth. It will give biologists, chemists, ecologists, and others a great deal of new data *and equipment* to work with. Nothing that's done in space is isolated from its terrestrial spin-offs; everything that's done in space will have some beneficial spin-off for those who remain on the ground.

Kipling's admonition also applies to propulsion technology for a manned Mars operation. When considering the problem of getting there, one usually thinks only of various modes of classical rocket reaction propulsion.

For the magnitude of the sort of Mars operation under discussion—go there and *stay*—the propulsion aspect of the journey *could* be accomplished with hydrogen-oxygen liquid propellant rocket engines, but just barely, if at all.

The next rocket propulsion system that comes to mind is the Nerva-type nuclear rocket, wherein a working fluid of liquid hydrogen is heated by a nuclear reactor and expelled through a DeLaval nozzle. The technology of the Nerva nuclear rocket is well established because examples were operating on test stands in Nevada before the Nerva program was subjected to a slow death by budgetary hunger in the early 1970s. The Nerva-type nuclear rocket system *could* do the job, but again, just barely.

Exotic nuclear rocket systems have been proposed, and the one that has received the primary attention is the "nuclear light bulb" rocket engine, which is nothing more than a highly sophisticated Nerva system employing a gaseous nuclear reactor that nobody has built and operated yet.

Strangely, what is probably the most efficient and practical nuclear rocket system for a Mars mission undoubtedly won't be used at all. This is the Project Orion nuclear pulse rocket. The efficiency of this system is so good that it's possible to use it to propel a manned *interstellar* mission. Basically, a series of nuclear fission bombs is ejected sequentially from the aft end of the space ship to explode behind the ship; the shock wave of the explosion reacts against a pusher plate on the aft end, providing the forward momentum. Considerable work on the concept was done at Los Alamos Scientific Laboratories, and test flights actually took place in California using conventional explosives. The Project Orion test vehicle is now in the National Air & Space Museum in Washington, D.C. The authors of the 1963 Nuclear Test Ban Treaty and the 1967 U.N. Treaty of Principles did not have Project Orion in mind when the treaties were drafted, but the gist of these treaties makes it *undesirable* to utilize nuclear pulse rockets. (There are no enforcement teeth in either treaty that would provide punishment for breaking the treaties; it's just been in every nation's best interests—excepting France, the People's Republic of China, and India, who still conduct nuclear test explosions in the Earth's atmosphere—to refrain from breaking the provisions of either treaty because of the dangers of reciprocal action by others.)

However, new and exotic propulsion schemes have arisen in the past decade which may provide suitable solutions to the propulsion problems.

One of these is the sailing ship of space, the solar sail concept or "Sunjammer." The idea of using the pressure

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of photons in sunlight to provide propulsive energy occurred to Carl A. Wiley in 1950. Numerous other people have worked on solar sail concepts since then, and the solar sail was seriously considered at one time as a means of propulsion for a Halley's Comet rendezvous mission. In the weightless or "strain-free" environment of orbital space, it would be possible to fabricate a very large reflective surface of extremely thin (0.006 millimeters' thickness or less) plastic film. A large solar sail could be fabricated in the vicinity of LEO Base and would be capable of propelling very large payloads almost anywhere in the solar system . . . slowly. The benefit of this propulsion scheme is obvious: it requires no working propellant, depending as it does only on the pressure of sunlight. The disadvantages include very low accelerations which mean very long travel times, plus a very large surface area which is vulnerable to micrometeors.

Given a reliable closed-cycle life support system plus a suitable means for protecting the human passengers against the radiation of solar flares en route, either scenario could be carried out at a reasonable cost using solar sails.

But the synergism of concurrently expanding space industrialization opens up two other propulsion possibilities, one for use in unmanned cargo ships and the other for both manned and unmanned ships.

Just as the solar sail uses the energy that's already in space, so these two schemes depend upon solar energy.

The linear electric motor concept has been around for decades and it's in daily use in small applications in the form of solenoids. Build a long enough linear electric motor and provide the electric energy to operate it by use of photovoltaic panels *or* the output of a solar power satellite, and you have the electromagnetic catapult or "mass driver." As a propulsion system itself mounted on a space vehicle, it suffers from low efficiency plus an "exhaust" that amounts effectively to a continual stream of meteors being ejected from it. But if the mass driver is located in orbit or on the Moon and is used to provide the necessary velocity vector to a payload, it becomes a highly efficient means of propulsion for payloads that aren't acceleration sensitive. Mass drivers in Earth orbit or on the Moon could be used to launch supplies to the Mars operation because the velocities required are well within the capabilities of current mass driver designs. Furthermore, it would not require that a mass driver be dedicated to the Mars operation; any suitable mass driver could be used with its launching computer re-programmed to supply the proper velocity leaving the mass driver at the proper launch time. Mass drivers can supply the acceleration-insensitive cargo propulsion to support the Mars operation.

The catch is that the mass drivers must be built and in place in the Earth-Moon system, where their application in space industrialization justifies their existence. To build mass drivers solely to support a Mars mission would be beyond the discussion of our scenarios and probably far too expensive.

But the build-up of space industrialization activities in the Earth-Moon system, especially the construction of solar power satellites to provide electricity to

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Earth *or* to other space facilities in Earth orbit or on the Moon makes possible a whole new series of propulsion schemes for solar system transportation.

With a space ship free of having to carry along either a solar cell array or other type of electric generating system, the electric or ion rocket graduates from the sort of device that provides a mere whisper of thrust to a system which, supplied with gigawatts of electric power via a microwave beam from an SPS, can produce enough *constant thrust* to accelerate a space vehicle at a modest fraction of a standard gee (1000 centimeters per second per second). The same technology that permits the accurate direction and focusing of a microwave beam on an Earth rectenna is readily adaptable to following the pilot beam of a space ship mounting a much smaller rectenna. The rectenna on an electric space ship can be more compact because the microwave power beam can have a higher energy density than the 23-40 milliwatts per square centimeter that's required for safety around an Earth rectenna.

Electric and ion rocket engines have extremely high efficiencies in terms of specific impulse, and with power derived from an SPS they can provide *constant acceleration* during their journeys.

Constant-boost or constant-acceleration space travel really cuts the solar system down to size, and it's possible in the late 1990s once large SPS units are operating in orbit, because they can supply the energy necessary for such propulsion schemes.

For example, at a tenth of a standard gee (10^{-3} km/sec^2) a trip from Earth to Mars with Mars on the other side of the Sun is a mere 14.3 days. At a hundredth of a standard gee, it's 45.2 days. At Mars opposition, it's possible to hop over to Mars in 14.9 days at a constant boost of only a hundredth of a standard gee. (Trips to Luna become a matter of *hours* at fractional-gee constant boost.)

If electric and ion rockets won't cut it, the new concept of the laser rocket probably will. This was the brainchild of Dr. Arthur Kantrowitz when he was still at Arthur D. Little, Inc. Basically, a laser rocket uses a large megawatt laser that's planet-mounted or run in conjunction with an orbiting SPS to provide its energy. The laser beam is aimed at the tail end of the space ship, where there is a nozzle and a reaction chamber filled with solid reaction mass. The laser energy converts the reaction mass to gas which is expelled in normal rocket fashion . . . and the space ship *goes*. However, we are probably looking at a time frame of about 2000-2010 for this concept, although it could become reality sooner once the synergy of space industrialization and planetary exploration is recognized.

With a constant-boost rocket system, Scenario One becomes economically and technically feasible.

But the same propulsion technology that makes Scenario One feasible also makes Scenario Two almost inevitable.

The time-line then looks something like this:

During the 1980 decade, the space shuttle makes possible LEO Base, early space processing leading to profitable space products, and the initial RDT&E on solar power satellite technology.

During the 1990 decade, space processing gains momentum and requires

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larger and more extensive space facilities requiring closed-cycle life support systems and considerably more energy. The SPS system, if we go ahead with it, requires a large transportation system, large space facilities with many people, and extensive use of closed-cycle life support systems. The SPS units may not be required or desired for beaming energy to Earth, but during this decade at least several of them will be an economic necessity to provide the required energy for space industrialization activities in Earth orbit.

By the turn of the century, the economics of space industrialization coupled with the availability of a larger space transportation system and abundant space energy will permit a return to the Moon, which in turn means the development of mass drivers for more efficient cargo transport. The turn of the century also brings with it new propulsion technology because of the abundance of copious amounts of electricity from SPS units in Earth orbit and *on the lunar surface*. SPS units for providing space facility power may also be built at the Earth-Moon LaGrangian Points L-4 and L-5 because GEO may get a bit too crowded for big SPS units dedicated to space power.

Scenario One can be carried out with solar sail technology sometime around 1990 when (a) LEO Base is established, and (b) closed-cycle life support systems become available. It's also barely possible to consider Scenario Two at that time, but the growth of space industrialization may not justify Scenario Two until about 1995-2000. Scenario Two can be carried out with solar sailing for propulsion provided that suitable closed-cycle life support systems and some means for solar flare protection are available.

But energy is the key. By the year 2001, if we have available gigawatts of electric power on radio or laser beams in space, we will have the key to constant boost propulsion technology that makes the Mars operation almost a weekend picnic.

Only a few of the potential synergies have been discussed here. There are probably others. But the key to the solar system rests in (a) LEO Base, (b) closed-cycle life support systems, and (c) abundant energy availability in space. Once those three things are available, it's possible to conduct manned Mars operations along with jaunts to Venus, Jupiter, Saturn, the planetoids—wherever one wants to go. As Robert A. Heinlein put it, "Once you get to orbit, you're halfway to anywhere." We can add to that, "Once you get to orbit with closed-cycle life support and lots of available energy, you've got the solar system in your pocket."

It's going to be possible to get to Mars a lot easier than many people have believed possible. This is because people have not thought big and have not thought in the synergistic terms of historic progress.

Which brings us to the question: Once we get to Mars, what are we going to do there?

The two Viking Landers did *not* settle the matter of the existence of life on Mars.

G.V. Levin and P.A. Straat, the designers and builders of the Viking Labeled Release (LR) Experiment, are at

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considerable odds with doubters such as Lynn Margulis, who believes that "there is no evidence for current life on Mars." Levin and Straat pointed out in *The Sciences* as recently as April 1981 that with regard to the LR Experiment, "The results and their interpretation still leave unresolved the question of whether the Mars LR data were generated by biological or chemical activity." The LR experiment itself has an amazing pedigree. It was performed more than 2,000 times over its 15-year development period. Never once did it give a false positive reading with natural or sterilized soils. It was shown to be effective with bacteria, fungi, algae, actinomycetes, protozoa, yeast, lichen, phototrophs, chemotrophs, heterotrophs, aerobes, anaerobes, and facultative anaerobes. Every objection to the detection of life by the LR Experiment that has been raised by the doubters has been scientifically answered by Levin and Straat.

In short, the data isn't yet solid enough to conclude conclusively that there is no life on Mars.

In the absence of positive data to the affirmative or negative, we'd better not put people on the Martian surface for fear of contaminating what may turn out to be the only place in the solar system where life may have evolved independently of Earth.

So the first task of a manned Mars operation should be to occupy Phobos, turn it into a LMO (Low Mars Orbit) base, utilize the elements in the rocks of Phobos for life support and facilities structures, and set up housekeeping on that Martian satellite. Its mass will certainly help protect the people there against radiation from solar flares. And it will provide a suitable base from which to dispatch manned and unmanned Martian orbiters for both survey *and* to control sterilized robot landers and rovers.

The human presence on Phobos —"living off the land" of that satellite by using its material resources, being resupplied from Earth orbit from time to time, and in permanent residence there—cuts the delay time for Martian surface robots from hours to seconds. It makes it possible to land sterilized robots to search for life and resources. The search for life is scientific and philosophical with profound effects regardless of the answers obtained. The search for resources is entrepreneurial, providing value received and, it is hoped, paying for the operation in the long haul.

We can have a permanent human presence on or around Mars in a quarter of a century or less, a presence that will not only answer scientific questions and provide new planetary data, but will also eventually provide Martian raw materials for use by the human race in space and on Earth. We do not yet know what those Martian resources consist of. Any evaluation at this time would be identical to making an assessment of terrestrial resources on the basis of data sent back from automated landers on the Sahara Desert and the Gobi Desert. (Remember, Mars has the same land area as Earth.) We will simply have to go to Mars, spend time there, and actually survey the planet to determine the extent and nature of its resources.

This does not mean that we will turn Mars into a gigantic open-pit mine, any more than we have done the same to

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Earth. If you have this perspective of Earth, take a cross-country flight in a single-engined general aviation airplane instead of a pressurized jet-propelled human cattle car that flies six miles above the clouds. Seen from a perspective only a mile above its surface, Earth is mostly open tracts of land with isolated patches of dense human habitation and associated waste products. The Earth and the human beings living upon it suffer only from localized Malthusian crises. The center of New York City doesn't even resemble the countryside a mere hundred kilometers away, and the same holds true for any terrestrial conurbation.

But going to Mars does mean that an enormous amount of planetary science and exploration can be accomplished —far, far more than most space scientists can now possibly foresee—once space industrialization becomes more firmly established. Space industrialization will provide much greater manned space transportation capability, enough that space scientists need not be content to send remote explorers to the far corners of the solar system but can instead go along themselves, conducting exploration with robot explorers over short distances with short time lags where absolutely necessary. Space industrialization also means energy availability in space, which in turn means entirely new propulsion systems with the potential of constant acceleration flights that make a trip to Jupiter and the Galilean satellites only a matter of three weeks at a tenth of a standard gee. Even a flight to Neptune becomes no more than a seven-week journey when beamed energy propulsion systems are used.

In the early years of the twenty-first century, some of us may be on or around Mars and will look back with amusement and some dismay at the antics of space scientists haggling over payload opportunities and budgetary funds. There are great arguments over doing this thing or that thing in space; did anybody ever stop to consider that it may not be necessary to make a choice, that we may be able to do *everything we want to do?* If we play the cards correctly in the next quarter of a century and turn the solar system into a *useful* and *valuable* place to work and live, we will have created a situation in which *everybody wins*—scientists, industrialists, financiers, entrepreneurs, and everybody on Earth and in space.

The dawning age of space industrialization offers as much hope to science as the beginning of the First Industrial Revolution did in 1750 . . . and more.

We can go to and live on the Moon. We can build habitats in Earth orbit.

And within twenty-five years we can bring to reality the morning greeting of Tsander, *"B Mapc!"* And using either a remote teleoperator or a pressure-suited human explorer, we can fulfill the forecast of former NASA Administrator Dr. Robert A. Frosch who, upon receiving the donation from the Viking Fund to help keep the Lander operating, unveiled a memorial plaque designating the Viking 1 Lander as the Thomas A. Mutch Memorial Station—named for a NASA scientist who had recently died in Antarctica—with the charge that one of his successors see to it that the plaque was firmly attached to that robot lander.

Onward to Mars!

And to the stars beyond. ■

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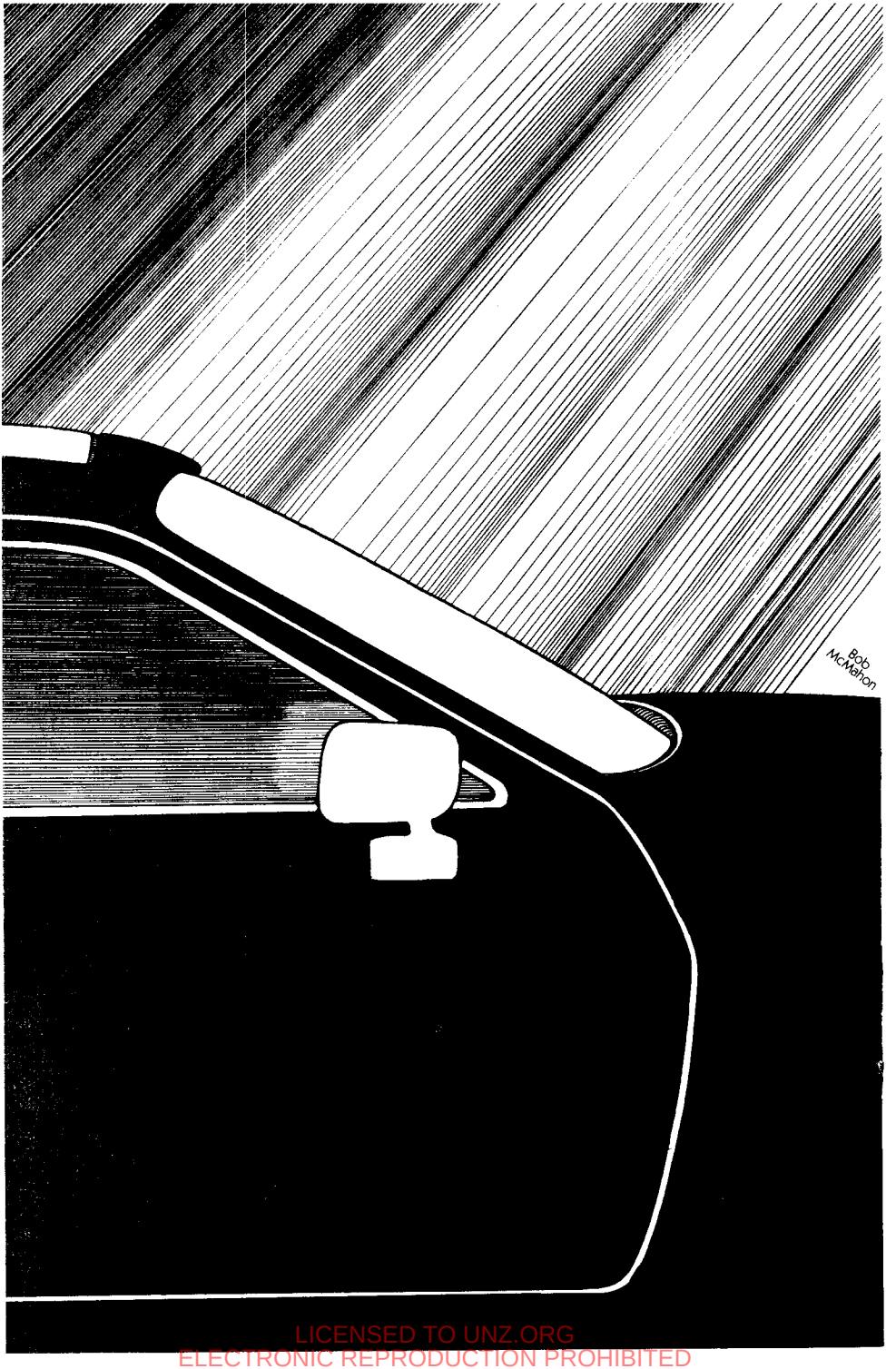

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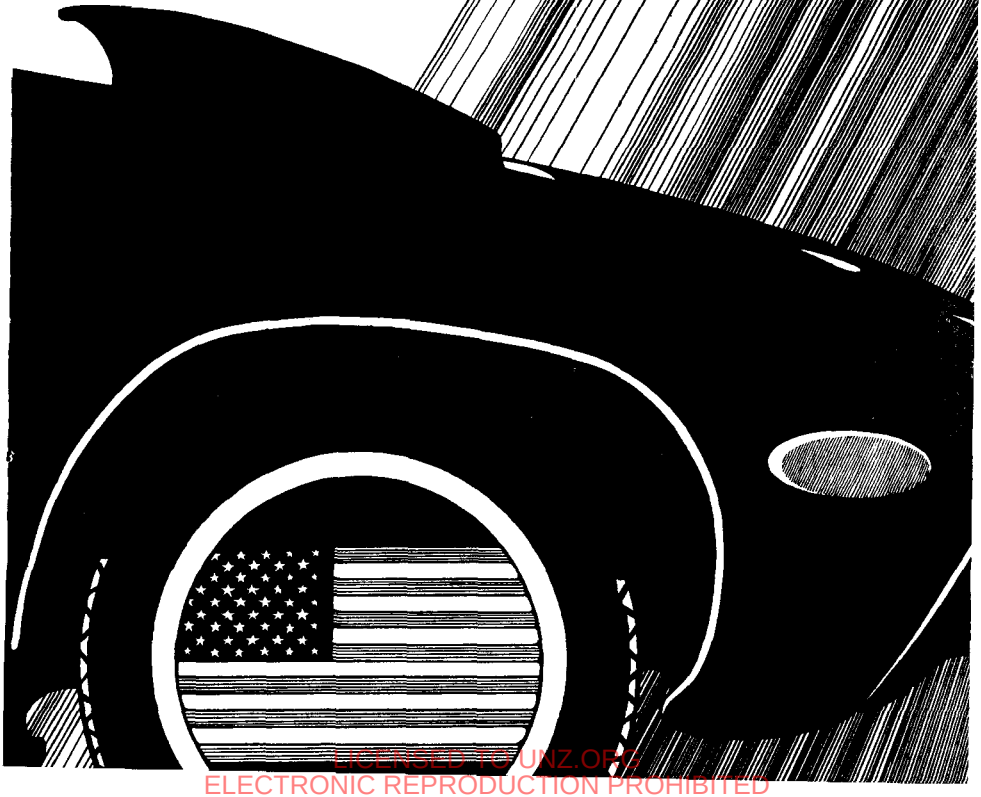
Christopher Anvil

TOP LINE

The basic questions of economics are questions of values. Trying to answer them too simply is not, in the long run, always best....



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Tokyo, January 3. Once again, Japanese auto production has outstripped all competition. In the words of Setsui Tamizake, outspoken head of giant NKF Auto Industries, "We are the best."

Detroit, January 4. In a packed news conference, Frank B. Service, president of troubled U.S. automaker Colossal Motors, admitted to another loss of over two billion dollars, "due to a lack of customer appreciation of the merits of our new Z-car."

Washington, D.C., January 6. Legislation to further restrict foreign imports is reported still stuck in committee. The main objection is that foreign goods are often cheaper, so that stopping these imports would further accelerate inflation.

New York, January 7. Interest rates are rumored to be on the way down again. On the rumor, the Dow-Jones Industrial Average today soared more than seventeen points, to 467.79.

Kapungoola, January 8. The price of oil is going up again. Delegates to the Oil Producers Price Adjustment Congress today agreed to an immediate five-dollar-a-barrel increase, blaming "renewed inflation in the oil-consuming nations."

Detroit, January 8. G. Bates Merritt, former president of bankrupt Mammoth Motors, today warned that, "this country can't continue to support foreign manufacturers." Speaking to a meeting of the Auto Industry Emergency Council, Mr. Merritt stated, "What we need is a partnership of Capital, Labor, Government, and the American consumer. The Japanese succeed because their government backs business, and their consumer never gets a chance to squander his money on all kinds of foreign goods. Either we voluntarily stick together, or we're all going down the rathole together, involuntarily."

Silicona, Calif., January 11. Edwin A. Storch, inventor of the lattice-channel-junction technology that has revolutionized the booming microelectronics industry, was today questioned about the Detroit situation by veteran financial reporter Rupert Neal:

Q: "Mr. Storch, should we shut out foreign auto imports?"

A: "No, we ought to obsolete them."

Q: "How do we—"

A: "Quit this step-by-step fooling around, and redesign from the ground up. The last large-scale innovator the auto industry had was Henry Ford."

Q: "You're saying Detroit is out of date?"

A: "I'm saying the whole auto industry is out of date."

Q: "How about the Japanese?"

A: "Hard-working, efficient people."

Q: "What about their cars?"

A: "They're dinosaurs."

Q: "They're profitable, aren't they?"

A: "So was Detroit, when it was turning out two-ton gas-eating monsters with nothing new but the chrome trim. You're talking about profit, the so-called 'bottom line.' "

Q: "That's the name of the game, isn't it?"

A: "Which game? I'm talking about progress."

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Q: "You can't separate the two, can you?"
A: "Are you kidding? They used to have two-wheel brakes on cars. Rickenbacker saw the opportunity for improvement, and built cars with four-wheel brakes; there was a whispering campaign that four-wheel brakes were unsafe, and his car was finished right there. Chrysler saw that streamlining would be an improvement, and then the customers didn't like the style. If innovation was the same as profit, all successful businessmen would be inventors. They aren't the same. But we can beat the imports if we obsolete them."
Q: "Would you say that you, yourself, combine innovative and business skills?"
A: "I'm not a businessman. When I got the idea for LCJ technology, I wasn't strictly even in the microelectronics industry. I just thought I saw a way to revolutionize microprocessors."
Q: "And it worked, didn't it?"
A: "True. But if I'd had to be a businessman, too, I don't know. I went to a banker, thinking to get some backing, and he said, 'Mr. Storch, I don't understand a word you're saying. And I have serious doubts. You suggest too large an improvement from your idea. You are basically a chemist, experienced mainly in coatings—durable surface coatings, I believe—*not* in microelectronics. And you don't have an actual working model to show me. But never mind. I'm going to give you a name and address, and a note to take with you. The man I am sending you to is a venture capitalist. He may decide to risk some money, and find you a partner to take care of the ten thousand business details you've never dreamed of. If he says "yes," come back.' "
Q: "Did he say 'yes'?"
A: "Luckily."
Q: "But, now, you're saying Detroit can't beat the imports, or what?"
A: "I'm saying the whole fight so far is a waste of effort. We need a new product."
Q: "Why don't *you* make it?"
A: "I'm an innovator, not a businessman. I see the technical part, but that's all."
Q: "Why not get the government to help?"
A: "The government wants to keep Detroit afloat. What I want is a car that's not another dinosaur."

Honolulu, January 14. Jacob L. Arnow, the American financier, today ceded control of the Interislands Restaurant and Hotel chain to Oceanasian Development, a foreign-dominated investment organization believed to be controlled by Setsui Tamizake, head of NKF Auto Industries. Mr. Tamizake, reached in Tokyo, refused comment on his role in Oceanasian Development, but said, "Arnow is just a drop in a receding American financial sea. He should have seen this, and his losses would have been smaller."

San Francisco, January 15. Jacob Arnow, the financier, was questioned here by reporters as he debarked from the *Islands Belle*:
Q: "Mr. Arnow, did you hear what Tamizake said about you?"
A: "I care more about what he did to me."

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Q: "Is it true that you lost ten million dollars?"
A: "That's none of your d——d business."
Q: "What's your answer to Tamizake?"
A: "I won't answer him in words."
Q: "Mr. Arnow—"
A: "Out of my way."
Q: "Mr. Arnow, why did you come back by boat instead of a plane?"
A: "To think over something I saw in the paper."

Washington, January 17. Renewed concern is being expressed here over the size of the Federal budget. And inflation appears to be accelerating again.

Zurich, January 18. The dollar resumed its vertical fall today, on word of lower interest rates in the U.S.

Washington, January 19. Dr. H. Walter Schoen, new head of the Federal Reserve Board, denied that he intends to lower interest rates. "To assure a stable dollar," said Dr. Schoen, "it is essential to maintain realistic interest rates above the rate of inflation."

Zurich, January 21. The dollar rebounded today on news of higher U.S. interest rates ahead.

New York, January 21. Panic struck Wall Street on word of another jump in interest rates. The Dow-Jones Industrial Average plunged thirty-eight points to a new low of 396.

Detroit, January 23. Frank B. Service, head of troubled Colossal Motors, today blasted "chaotic conditions in the financial markets" for the continuing problems facing CM. "How," Mr. Service demanded, "are we supposed to plan ahead? You can't borrow money without going broke paying the interest. You can't sell stock to raise money, because the stock market has turned into some kind of city dump. If you've got foreign subsidiaries, you have to juggle dollars, pounds, francs, marks, and yen, and you don't know what any of them will be worth three months from now." Explaining a new wave of firings, layoffs, and plant closings, Mr. Service said, "It's the only way to stay in business. We just can't ignore the bottom line."

Tokyo, January 31. A delegation of Japanese businessmen is reported to have prevailed upon outspoken NKF head, Setsui Tamizake, to change his speech before the Asia-America Friendship Society. Mr. Tamizake's original speech is rumored to have contained the words, "to America belongs the past, and to us the future." In his revised welcoming speech today, Mr. Tamizake said, "We of Asia honor the great deeds of America's past, and aim to build our future upon heights you have known before." Mr. Tamizake then took the delegates on a tour of the gigantic NKF Auto Industries Main Plant.

Silicona, Calif., February 16. Edwin Storch, inventor of the lattice-channel-junction technology and chairman of LCJ Corporation, today confirmed rumors that he met recently with financier Jacob Arnow. Asked the reason, Mr. Storch replied, "Oh, Jake and I like to go fishing together."

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New York, February 17. Financier Jacob Arnow, questioned about a possible venture with hard-coatings and microelectronics wizard Edwin Storch, admitted contacting Storch last month. Rumor has it that the two men discussed producing a new type of car. Arnow refused comment on these rumors.

Detroit, February 17. Auto industry officials here discount rumors of a new car. "If anyone could do it," said one auto executive, "CM would do it. Their new Z-Car is first-rate, but in this economic climate, it doesn't sell. A newcomer would be wiped out."

Washington, April 20. The Administration is reported putting pressure on the Federal Reserve to bring down sky-high interest rates.

Geneva, April 21. The dollar plunged again on fresh rumors of a drop in U.S. interest rates.

Washington, June 20. Word is circulating here that the latest economic figures are unusually bad.

Seraloa, July 1. The Quarterly Conference on Oil Price Readjustment today announced a price increase of fifteen dollars a barrel. Abu Sinkad Selou, chairman of the conference, warned, "The wasteful oil-consuming states must control their appetites." Chairman Selou also announced agreement on a new cut in oil production, "to save our irreplaceable resources."

Washington, July 2. Well-informed sources here warn of serious consequences if the renewed sharp oil-price increases continue.

Salambang, July 15. During a press conference, Seroo Seleen Tarabanda, oil-state firebrand and this month's price-adjustment chairman, jeered at rumors from Washington of possible "serious consequences" to new price increases: "If they had the power to dare to create 'serious consequences,' they would create serious consequences. If they had even the possibility, they would deliver a plain warning, publicly or in private to us. They do not possess even the possibility. So they make rumors. This is to soothe their simple-minded public. Confused, are they not?"

Washington, July 20. Recent comments by Seroo Seleen Tarabanda, chairman of this month's Oil Price Readjustment Conference, have hit this city like a pan of dishwater over the head. Senator Graham G. Young, chairman of the Foreign Affairs Committee, seems to express the general reaction: "You put enough heat on any explosive situation, and it's likely to blow up in your face. Tarabanda has now lit the fire."

Salambang, July 31. Seroo Seleen Tarabanda, Chairman of the new Monthly Conference on Oil Price Readjustment, defiantly announced "an initial monthly price adjustment of thirty-five dollars a barrel, 'to make up in advance for decreased purchases by the oil wasters.' " Many delegates are reported to have protested the increase, but to have been voted down.

Washington, August 1. Senator Graham

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Young of the Foreign Affairs Committee met this morning with the President, reportedly over the latest oil price increase. The senator is believed to have urged strong action, including military measures, if necessary.

Moscow, August 2. The Soviet Union today warned that "any interference" with the oil states "will be crushed."

London, August 4. There are persistent rumors here of a new U.S. weapon, due to be tried out on whoever raises oil prices the highest. Fantastic though the rumors seem, usually reliable sources believe there is substance of some sort behind it.

Norfolk, August 7. The newly formed U.S. Second Fleet is being fitted with what are spoken of as "normal weapons improvements." Spokesmen denied rumors of new weapons.

Washington, August 8. The President, in his news conference, refused to confirm or deny the truth of rumors of a new weapon.

Paris, August 10. Surprisingly detailed reports are said to have reached French naval circles of an American device which "essentially reproduces Archimedes's sun-weapon." The American weapon, according to these reports, involves a tremendous concentration of the sun's rays, by means of metallized film. The U.S. Embassy here has dismissed the rumors as "pipe-dreams, pure humbug."

Oil City, Sultanate of Tazar, August 16. Intense nervousness is evident here, in the light of recent rumors. Seroo Seleen Tarabanda, fire-brand head of last month's price meeting, is extremely unpopular here. A typical reaction was that of Abu Said Ha'ak, a leading politician: "Tarabanda would stick pins in a tiger to prove he is dead, and thereby wake him up. Would it have cost him money to be polite?"

Zurich, August 16. Dr. Heinz Bittendorfer, world-renowned economist, refused today to predict the outcome of the present world economic situation. "It is a hive of enraged bees. Who can say what will happen?"

Washington, August 16. The Defense Department revealed today that the heavily reinforced Second Fleet has entered the Mediterranean. Asked why, a spokesman replied, "To maintain the peace."

Moscow, August 16. In a strongly worded statement, the Soviet Union warned that "any imperialist interference with peace-loving nations will be crushed with an iron fist." Moscow is rumored to have sixteen divisions of airborne troops ready to move "at a moment's notice."

Oil City, Sultanate of Tazar, August 18. Tazar today announced a fifteen-dollar-a-barrel discount in its oil price. The Tazar foreign office earnestly denied asking for Soviet or U.S. protection, saying, "So far as we know, the peace here is not in any danger. We just want to live quietly."

Sabadang, Golduhar, August 20. The

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Sheikh of Sabadang today cut the Sheikhdom's oil price by twenty dollars a barrel, "for competitive reasons."

Washington, August 21. Most Congressmen report that their constituents show no gratification at the recent drop in oil prices. "They're mad," said Congressman Nicholas Veale, "and they're waiting for some new stunt."

Paris, August 28. As yet, no sign has been found of Seroo Seleen Tarabanda, oil-state firebrand who arrived here during a visit earlier this month. Police spokesmen offer little hope for his safety. "We are not the only ones looking for him. We are just the only ones he can afford to be found by."

New York, September 15. The prime rate dipped today. It is now below thirty percent at most major New York City banks.

Washington, October 1. The steep drop in oil prices is reported to have had little impact in lowering inflation, as the drop merely cancels the preceding steep increases.

Detroit, November 2. Frank B. Service, president of Colossal Motors, today held a news conference at which he announced the first of the new "Q" cars. "With gas again below $5.50 a gallon," said Mr. Service, "we expect the consumer back in the marketplace." Mr. Service admitted that this has not happened yet.

Tokyo, December 15. Setsui Tamizake, outspoken head of giant NKF Auto Industries, has admitted to a falling off of sales, though NKF has further increased its market share. Mr. Tamizake suggested no reason for the sales decline.

Bernhardt, Minn., December 20. Professor Charles Arden of the Bernhardt World Analysis Clinic today reported "recent studies conducted by the Clinic indicate an 'oil psychosis' that is becoming worldwide. There has been so much trouble from oil that people are actually becoming sick of it." Dr. Arden also reported that studies carried out for auto manufacturers suggest that the automobile itself has acquired a negative image. "People now equate the auto with Expense, Breakdown, Recalls, Pollution, Inflation, Shortages, and Waste. This isn't encouraging for an early upturn in car sales."

Zurich, January 4. Dr. Heinz Bittendorfer, world-renowned economist, warned today that the world may be slipping into a deep depression. "In present circumstances, a depression is only too possible. We have very high interest rates, continuing inflation, tight credit, and extremely high fuel prices. There is, moreover, the *feel* of a depression. There is a sullenness, a grayness. I think this is it, a depression. And I do not know the cure."

New York, January 5. Financier Jacob Arnow, in a rare appearance on Wall Street, was questioned by reporters about the statements of Dr. Heinz Bittendorfer, the renowned Zurich economist:

Q: "Is Bittendorfer right?"

A: "I'm not an economist."

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Q: "You're a financier, aren't you? Isn't that the same?"
A: "They have theories. We're stuck with the reality."
Q: "You've got an opinion?"
A: "Who hasn't?"
Q: "Stop stalling. Is Bittendorfer right?"
A: "Look at the papers. Where's the Dow-Jones Industrials? 316 yesterday, wasn't it? What do you need an economist for? Sure we're in a depression. What else could it be?"
Q: "Since you're a financier, isn't it your job to get us out of it?"
A: "You're a newsman. Is it your job to get me good news?"
Q: "You know what I mean. *Isn't* it?"
A: "Well, the government isn't paying me for it. My first job is to make money, or I won't be a financier very long."
Q: "What about the new car?"
A: "No comment."
Q: "Bittendorfer doesn't know how to end a depression. Do you?"
A: "Yes, and so do you. So does Bittendorfer. You end a depression when people see something worth so much more than what it costs that it starts the money flowing again."
Q: "How can something be *worth more* than it costs? Isn't everything 'worth' what it costs?"
A: "No. That's just the price. The worth of the thing is different. If something will do a lot more for you than the money it costs, the odds are you'll find some way to buy it. When things generally are worth more than their prices, and people realize it, they'll buy, and enough of that will end any depression. You start with bargains."
Q: "What's stopping it from happening now?"
A: "Look where the oil price is. Look at the interest you have to pay if you borrow money. Look at the price they put on the Q car they were sure would sell. Look around, and you tell me where there's a bargain anywhere in this high-price place."
Q: "How about the stock market?"
A: "Sure, once we come out of this mess, this will have been a great time to buy. Meanwhile, it *could* go down another hundred points. Hop right in, why don't you?"
Q: "If you know so much, why don't *you* end it?"
A: "No comment."
Q: "*Can* a so-called financier end it?"
A: "*If* he finds the right innovator."

Sabadang, Golduhar, February 24. The Sheikh today refused to lower prices by the additional $2.50 per barrel reported of other producers. "I do not need more dollars," the Sheikh is reported to have said. "If they will not buy at this price, I will cap the wells. The oil, once burnt, is gone forever. They can print endless dollars. Therefore, the oil is worth more than the money."

Washington, June 11. The Administration today reported that the Armed Forces are at last up to full strength. The economy is so bad there are still plenty of volunteers looking for at least some job. In the words of the Treasury Secretary, "We are in a stagflated depression, and I don't see which way is out."

New York, August 25. The Dow-Jones Industrial Average slid fractionally below 300 today, then rebounded, to close

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at 302.46. (See our special article, page D4.—"Can It Go Lower Than Zero?")

Skogosh, Wisconsin, September 29. There has been a small business here for years that has produced a type of ultra-tough resin for specialty use in industry. As the economy has declined, orders for this resin have *increased.* The small shop has gradually expanded, at the urging of its customers, and now employs over two hundred and fifty persons. The owner cannot explain why orders have increased. Today he received a huge new order and must expand again to keep up.

Washington, October 15. The latest Economic Conference has ended in another blind alley. This time, not even a report is to be issued.

Zurich, October 21. Dr. Heinz Bittendorfer, world-renowned economist, announced today that, after a careful computerized study lasting more than six months, "No way out of the Stagpression exists. Everything is too well balanced on a low level. I cannot explain it to the layman. To the scientifically educated, I would suggest the comparison of entropy. We are falling economically to a state of maximum entropy."

New York, October 21. The stock market today collapsed 29.79 points, to a new low at 181.86.

New York, October 22. Financier Jacob Arnow today called a news conference to announce the production of a new vehicle, the "Star," named from a combination of the first letters of inventor Edwin Storch's name and that of Mr. Arnow. Arnow also stated—and he insisted that he was serious—that the bottom of the economic cycle has now been reached. Mr. Arnow claimed that the Star vehicle "will lead the way upward in an economic advance possibly equal to that following World War II." He then answered questions put to him by skeptical reporters:

Q: "Mr. Arnow, don't you have any model, or at least some pictures, of this new car?"

A: "We're keeping the details secret."

Q: "Why?"

A: "It's a new concept."

Q: "Does it run on wheels?"

A: "Yes."

Q: "Does it have an engine in it?"

A: "Ye-es."

Q: "Does the engine run on gas or oil?"

A: "No comment."

Q: "What's so new about it?"

A: "It will get over a hundred and forty miles to the gallon in favorable conditions."

Q: "What are favorable conditions?"

A: "Good weather."

Q: "What's that got to do with it?"

A: "It takes fuel to run the heater in cold weather."

Q: "Are you serious?"

A: "Of course, why not?"

Further questioning drew no more information from Mr. Arnow.

New York, October 22. On first word of the Arnow interview, the stock market rose five points. (See "Interview" on page D2.) When the full interview became known, the stock market fell

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twenty points. (See "Disaster," page A1.)

Silicona, Calif., October 23. Inventor Edwin Storch today backed up the claim of financier Jacob Arnow that the two men are producing a new vehicle named the Star:

Q: "Are you, or aren't you?"

A: "Yes, it's in production. And 'Star' is the name. It fits. In more ways than one."

Q: "Where are you building it?"

A: "I said it's in production. I didn't say we're building it."

Q: "How do you produce it without building it?"

A: "*No comment.*"

Q: "Is this going to be just as uninformative as Arnow's interview?"

A: "Probably."

Q: "Why? The whole country's waiting for the answer! Are you serious, or are you kidding?"

A: "Serious."

Q: "Then why are you stalling?"

A: "You want a serious answer?"

Q: "Yes."

A: "To give Jake Arnow time."

Q: "Time?—For what?"

A: "He's a financier. If you can't deduce what he wants time for, you're not reporters."

Q: "He's—You're saying he's *buying stock?* That doesn't—"

A: "He's assembling control of the public companies we'll need to go into large-scale production. That's *his* special skill, not mine."

Q: "Can he do it?"

A: "He thinks so. That's enough for me."

Q: "What's new about this car?"

A: "He's told you."

Q: "Good gas mileage?"

A: "Excellent mileage."

Q: "The imports get good mileage."

A: "You haven't seen anything yet."

Q: "What's revolutionary about this thing?"

A: "The power plant."

Q: "This 'Star' will beat the imports?"

A: "It will do more than that."

Q: "You're not convincing *us.* You won't convince the public. Where's a model?"

A: "We've got them coming off the line, but the purpose is testing, not sale as yet."

Q: "Where is this line?"

A: "*We'll explain that later.*"

This was all the information Mr. Storch would reveal. There have been no known models, no photographs, and no real explanations. Both Arnow and Storch appear serious. Both have formidable reputations in their fields. The consensus of reporters who heard them is that either they are bluffing for some unknown reason, or are actually onto something so big that they feel no need to explain.

Meanwhile, the Stagpression goes on.

Tokyo, October 23. Asked about the rumors from America, NKF head Setsui Tamizake replied, "It's a nice dream, but it isn't possible. We have the best, and we improve constantly. Even *our* sales are slow."

Detroit, October 24. CM today began recalling workers to its "A" car production plant.

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New York, October 24. Auto, steel, and rubber shares rose here today from the opening bell without a break. No-one has an explanation.

Silicona, October 25. A caravan of trucks today pulled into the huge Storch LCJ lot, crossed one by one to a loading dock covered by an enormous tent, and backed inside. The truck convoy is being guarded by the state highway patrol.

London, October 26. Observers here are convinced something is astir in the United States. A heavy flow of investment funds to the U.S. is reported.

Detroit, October 27. More workers are being recalled to the "A" production line.

Detroit, October 27. The head of a California truck convoy reached the main CM plant at 4:12 this afternoon under heavy guard.

Detroit, October 30. Representatives of major U.S. banks are reported meeting today in the main CM plant.

New York, November 1. The stock market continued its vertical rise, passing the 400 level.

Detroit, November 3. The "A" line here is being lengthened. It is reported that the truck convoy carried equipment to add to the line at crucial points.

New York, November 4. A financial reporter has managed to obtain access to information regarding stock market operation of persons believed acting for financier Jacob Arnow. This information reveals heavy purchases, at recent severely depressed prices, of shares in the giant automaker, CM; in suppliers of parts for CM; in certain chemicals manufacturers; in manufacturers of road-building equipment, tire manufacturers, and related companies; in many almost-bankrupt auto supply firms, and in some actually in bankruptcy. Arnow evidently sold, earlier, large holdings of oil stocks. The result is that he appears to have built up an integrated auto-building empire, in some respects almost comparable to Henry Ford's in the early nineteen-hundreds.

Tokyo, November 17. Giant NKF Auto Industries today reported a strong sales increase in the last month, outside of the U.S. NKF president Tamizake explained, "We have benefitted from the American news reports. People hear of an economic upturn coming, and feel they can buy a car now. Naturally, they buy the best car at the best price—ours. Except for the Americans. Out of patriotism, they are hoping CM and Arnow will come through, somehow. Personally, I doubt it."

Detroit, November 18. The first Detroit-built "Star" automobile rolled off the "A" assembly line at the CM main plant here at 10:01 this morning. A dark-green compact front-wheel-drive station wagon, with reclining front and folding rear seats, this car did not look like a revolutionary vehicle to watching reporters. But in the brilliant autumn sunlight, Frank B. Service, president of CM, walked across the huge freshly sur-

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faced parking lot to the car, removed the cap from the fuel tank, thrust in a flexible measuring rod, and drew it out still dry, showing that the tank was empty. He next took from an assistant a *one-pint can,* took the top off with a Swiss pocket knife, and handed the can around amongst the reporters. What was in the can looked and smelled like ordinary twenty-weight motor oil. Mr. Service emptied this can into the tank, and slid into the front seat. The car made no starting noise, but merely *slid forward silently,* with a faint crunching sound of occasional dirt particles under the tires. Mr. Service twisted the steering wheel, tied it with a short length of cord, apparently to a grab bar on the passenger's side, and jumped out. At last report, five hours after starting, the "Star" car is still circling silently.

Detroit, November 19. The only noticeable change in the Star vehicle, after twenty-two hours, is that the finish seems to have grown darker in the sunlight, eerily matching the dark surface of the newly refinished lot. The car now looks an intense jet-black, unusual in that it is a very flat finish without noticeable reflection. Nothing has been added to the fuel tank since that first pint of what looked like motor oil.

Detroit, November 20. The Star is still circling. The only change since it was started has been an occasional correction in the steering by a smiling workman stationed here for the purpose.

New York, November 21. Inventor Edwin Storch today announced further details of the Star's sales plan. The news conference, attended also by European and Asian reporters, revealed several staggering surprises, including the vehicle's price, announced by Mr. Storch:

A: "We're pricing it from about $5,000. The standard model will be $4,999 before taxes."

Q: "What?"

A: "Five thousand dollars apiece—for the standard vehicle in the A-body style. We have plans for a later Star of our own design, which will probably sell for $8,000 to start. —Later, we hope to lower the price."

Q: "Did you say *five* thousand for the A-body car?—Which is loaded with new technology?"

A: "Right."

Q: "How can you afford it?"

A: "First, volume production. Orders are pouring in from all over the world. Second, a rise in the value of the dollar. Third, a special road-surface program that will proceed at the same time as the car sales."

Q: "Why should the dollar go up?"

A: "Auto exports. Lower oil imports. We expect Star sales to directly cut into oil sales."

Q: "Because the Star uses less fuel! Wait, now—They can just cut oil production, again, and charge the same amount!"

A: "No. We no longer need their oil."

After the shouting died down, Mr. Storch continued:

A: "We no longer need gas for auto fuel. Our own production will handle other uses. Therefore, oil prices are going down. If they want us to buy, they'll have to compete with our own production."

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Q: "The road-surface program you mentioned—What's that?"
A: "A special reinforcement and surface treatment. We'll offer it to every city, state, village, county, and town, at a reasonable profit. At first, we expect to suffer a loss on our vehicle sales; but once enough of our vehicles are in use, we expect to sell the surface program all over the country, and, in time, all over the world."
Q: "How do you figure that?"
A: "Cars are owned by adults. Adults vote. Where they don't vote, they still make their desires felt in one way or another."
Q: "Where's the gimmick?"
A: "Long-term, the cars won't run reliably without the road surface treatment. Because what we're selling rests on two related products. First, a greatly improved storage battery. Second, a photoreactive coating capable of being applied by molecular spray, using a special process to form, in effect, a complete layer of photocells on the auto's surface. The car is then constantly absorbing light and charging its battery. But suppose you exceed its capacity?"
Q: "Yes. How does this road treatment help?"
A: "We lay down this same general kind of surface *on the road itself.* Embedded in the surface are thin strips that define the lanes for cars equipped to sense the strips; all Star models come equipped with the sensors."
Q: "You are saying the road becomes, in effect, an *endless series of photocells?*"
A: "Why not? Why waste all that road surface? There are two-, four-, and six-lane highways roasting in the sun with hardly any traffic a good part of the year, or a good part of the day for almost all year. The problem is to accumulate that energy. Another problem is to *transfer* energy throughout the system. Why have people stranded in Montana and overflowing with unused energy in New Mexico? Once there's a continuous road surface from one region to another, the transmission layer helps equalize that available energy. The entire hard-surfaced road net accumulates, stores, and transfers energy to vehicles using the net."
Q: "Won't the traffic wear the surface off? It'll be all over the road."
A: "Star cars sense the location strips, and spend most of the time in readily predictable lanes."
Q: "So— You'll sell the vehicles at $5,000, say. Then, when there are enough sold in any given territory, your customers will vote for an improved road surface locally?"
A: "Now you have it."
Q: "And when adjacent sections are joined, the energy will flow from one section to another?"
A: "Yes."
Q: "What about *trucks?*"
A: "We expect the first Star truck to come off the line in about six months."
Q: "This surfacing material is a paint?"
A: "No, it's a durable surface layer, laid down by a series of precision spray deposition devices. It is a complex layer with an exceedingly durable surface."
Q: *"Durable?"*
A: "Yes. But not everlasting."
Q: "So it has to be replaced, patched, or refinished, from time to time?"
A: "Correct."

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Q: "How does this work in the north, with road salt, snow plows, and so on?"
A: "The photocell, storage, and transmission layers work, though of course there's much less energy accumulation than on clear roads in summer. Bear in mind, we intend to be coating the road surface, making the tires, and building the cars. Every part fits together. It can be done a lot easier with unified design of all components."
Q: "Those first Star cars we couldn't find? What were they?"
A: "Conversions of conventional cars, for test purposes."
Q: "That pint of oil, or fuel, in the tank of the first "A" Star car? What did it need fuel for, anyway?"
A: "The car has a small emergency engine, in addition to our type of storage battery. If we'd needed it, we'd have started the generator."
Q: "Why do you need a generator?"
A: "Some people live on dirt roads. Our layer won't work on a dirt road. There are also going to be places not yet joined up to other parts of the country. How do you charge the battery? You can't rely for sure on the local utility. It may already be overloaded. That's the purpose of the engine. In emergencies, you start it up, and *it* charges the battery."
Q: "So, the fuel cost—"
A: "In ideal circumstances, the fuel cost is nil. Eventually the battery will have to be replaced. The car surface is durable, and with reasonable care should last indefinitely. The road surface is also durable, but subject to wear, and will have to be redone at intervals, depending on usage."
Q: "I still don't follow how you charge this battery, unless you run the car's own generator."
A: "If your local utility isn't overloaded, you connect the car to a battery charger overnight. We have a special charger you can buy, if you want."
Q: "This is only till the roads are resurfaced?"
A: "Right."
Q: "The sun shines on the road, but how does the energy get from the road to the car?"
A: "In the right circumstances, at slow speeds, we can recharge the car on the road. We can theoretically do this at high speeds, but there are complications. What we expect is a chain of charging stations on or near the highways, possibly based on an arrangement with the present oil-company filling stations, which will receive the energy from the transmission strips, and quick-charge the battery for a fee. I might also mention our Star-lite conversion."
Q: "What's that?"
A: "Photolayered roof and siding panels for garage and, perhaps, house use."
Q: "Why 'perhaps'?"
A: "Not everyone wants a flat-black house."
Q: "It will charge the battery?"
A: "Right."
Q: "You're not planning to run the electric utilities out of business?"
A: "We expect to cut into their business in some ways, and increase it in other ways. The overall effect for their customers and ours is lower energy costs."
Q: "Resurfacing is where you expect to make the real profit?"
A: "Right. Bear in mind, if you've got a well-made road, our surface layer in-

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creases its durability, to lengthen the life of the road."

Q: "Where it works, then, you derive your energy directly from the sun—Which, incidentally, is a star!"

A: "Yes. That's another reason for the name."

Oil City, Sultanate of Tazar, November 23. Tazar today slashed its oil price all the way to twenty-one dollars a barrel.

Zurich, November 24. The dollar strengthened dramatically against all major currencies, as word reached here that work is already beginning to convert the gigantic U.S. road net into a nationwide solar-conversion plant.

San Francisco, November 29. Setsui Tamizake, dynamic head of ailing NKF Auto Industries, arrived here today to seek licensing agreements for the deposition-photocell process. A smiling Jacob Arnow met Mr. Tamizake at the airfield.

Honolulu, November 30. Some liquidation of foreign holdings is reported under way here, to help raise money for the licensing fees on the Star photocell process. One property reported to have changed hands was the Interisland Restaurant and Hotel chain, believed sold by Oceanasian Development to Jacob Arnow.

San Franscisco, December 3. Setsui Tamizake, dynamic head of ailing NKF Auto Industries, left today for Tokyo, looking somewhat pale, but carrying the necessary licensing agreements for the deposition-photocell process. A genial Jacob Arnow accompanied Mr. Tamizake to the airport.

Silicona, Calif., December 17. Edwin Storch, inventor of the deposition-photocell process, was cornered by reporters on the way to his car in the newly photosurfaced company lot:

Q: "Mr. Storch, will this boom in Star vehicles last?"

A: "We think so, because it's an honest bargain. Meanwhile, we're making the pilot model of a still more durable vehicle with especially useful features."

Q: "If your car is too durable, there go your replacement sales."

A: "I got a little tired of cars wearing out every three years, didn't you? The idea is to give solid value, not plant a suction pump in the customer's wallet."

Q: "You'll cut your bottom line, won't you?"

A: "We haven't forgotten the bottom line. But there's another line you don't want to forget, either."

Q: "What's that?"

A: "The bottom line is the gain *you* get. The top line is *the gain you deliver in return*. If you provide the customer with a buy well worth having, you've taken care of the top line. That doesn't guarantee a profit, but Ford, Edison, Bell, Land, and a host of others have done right by the top line, and everyone was better off because of it. Naturally, the bottom line is important. But there needs to be something on the *top* line first!" ■

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a calendar of analog upcoming events

23 - 24 January
MAGICON at Rault Center Hotel, New Orleans, La. Registration - $8. Info: Magicon I, 4567 Cerise Avenue, New Orleans LA 70127.

25 - 28 January
General meeting of the American Physical Society at San Francisco, Cal. Info: APS, 335 East 45th Street, New York NY 10017.

29 - 31 January
CONFUSION 11 (Michigan-area SF conference) at Plymouth Hilton, Plymouth, Mich. Guest of Honor - Philip José Farmer; Fan Guest of Honor - Neil Rest; Toastmaster - Larry Tucker. Registration - $15. Banquet, masquerade, dealers, art show, etc. Info: Ann Arbor SF Association, P.O. Box 1821, Ann Arbor MI 48106.

12 - 14 February
BOSKONE XIX (New England-area regional SF conference) at the Boston Park Plaza, Boston, Mass. Guest of Honor - Donald A. Wollheim (publisher, DAW Books). Panels, discussion groups, art show, hucksters, films, etc. Registration—$12 in advance, $18 at the door. Info: Boskone XIX, New England Science Fiction Association, P.O. Box G, MIT Branch PO, Cambridge MA 02139.

13 - 14 February
SCOUSE CON I At Liverpool Centre Hotel, Liverpool, Eng. Info: Roy Evans, 77 Selby Road, Orrell Park, Liverpool UK L9 8EB.

22 - 25 February
COMPCON Spring '82: High Technology in the Information Industry at San Francisco, Calif. Info: James Rudolph, Booz, Allen, and Hamilton, 525 Middlefield Road, Menlo Park CA 94025.

27 June - 2 July
JERUCON (First International Integrative Congress on Science Fiction, Fantasy, and Speculative Science). Many world-famous SF authors will be in attendance. Info: Organizing Secretariat, Jerucon 82, P.O. Box 394, Tel Aviv 61003, Israel. (Use airmail.)

2 - 6 September 1982
CHICON IV (40th World Science Fiction Convention) at Hyatt Regency Chicago Hotel, Chicago, Ill. Guest of Honor - A. Bertram Chandler; Artist Guest of Honor - Frank Kelly Freas; Fan Guest of Honor - Lee Hoffman. Registration - $15 supporting at all times. Attending - $45. This is the SF universe's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy-dress competition, the works. Join now and get to nominate and vote for the Hugo Awards and the John W. Campbell Award for Best New Writer. Info: Chicon IV, Box A3120, Chicago IL 60690.

—ANTHONY LEWIS

Items for the Calendar should be sent to the Editorial Offices ***five months*** *in advance of the issue in which you want the item to appear.*

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A receptionist's job is to get in the way. This one looked hard as a drill bit and solid as the Canadian shield. Mick Candido thunked his fat briefcase down on her counter. "Chug in?"

"Chug?" she wondered.

"Chug Prakken," Mick said. "Last I heard, he was boss of this outfit."

"*Mister* Prakken?" she ventured, as if he'd been speaking of God by His first name.

Mick shrugged. "Chug," he said. "Tell him Mick's out here."

She turned to her squawk box, played a tune on the buttons, spoke a few soft words. Mick couldn't hear what she said, but he had a few guesses. He spread his feet, folded his arms, and prepared to stick it out. The receptionist went back to her manicure job.

Thirty seconds later by the stopwatch, her callboard dinged. She glanced at the readout. Mick waited; it was turned the wrong way for him to see. "Mister Pomeroy will see you."

"I came to see Chug."

"Mr. Pomeroy is one of Mr. Prakken's assistants."

"An assistant," Mick said, pronouncing the word with unnecessary exactness, "is a something that empties the wastebaskets."

"Have you an appointment with Mr. Prakken?"

"Did you ask if Chug wanted to see me?"

"Mr. Prakken does not see anybody without an appointment."

"Ask anyway," Mick said. "Today I feel lucky. Tell him I'm wondering if he's got the five bucks yet."

She gave him a silent, cold look of the kind designed to reduce a man to an insect. Mick just stood there, undiminished. He could almost see something go click inside her. She played some more music on the buttons, said a few more words. Mick pulled a notebook from his pocket. He pretended to consult it, one page, then another. Presently the ice maiden looked up. "Mr. Prakken says he'll be delighted to see you." Something close to awe colored her tone. "And . . . I don't quite understand this . . . he says he's got the five if you've got change for a seven." She warmed a little. "He must know you."

Mick chuckled. "Time was we chased the same women, scraped the same mud off our shoes, and washed our hands in the same puddle. And he's owed me a fin ever since some of the boys taught him not to draw to an inside straight."

She gave him her best how-interesting-but-I'm-really-not-listening smile. "His secretary will be down in just a moment." She paused, a mild frown on her brow. "Usually they just buzz for a page."

"Like I say," Mick said. "We used to be buddies together."

If the receptionist had been mature and experienced, Chug's secretary was young, sharp, probably just as experienced, and as full of energy as a jug of nitro. Lugging the heavy briefcase and a few more years than he cared to think about, Mick had a hard time keeping up. Deliberately he slowed down. He wasn't going to walk in on Chug with his chest heaving. Let her walk at his pace for a while.

From the elevator, which felt and sounded very fast but took a long time just the same, she led him through a

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labyrinth of corridors. The carpet softened until their feet made no sound. The walls, which had been plain-painted plasterboard, became as they turned a corner panelled oak with paintings in heavy gold frames. An offshore drill rig; cattle grazing in a field of stripper wells; the abstract-yet-functional blend of geometry and color that was a refinery at sunset. Products of one of Chug's "Oil Greases the Arts" public relations campaigns. Chug didn't know much about art, but he knew what he liked.

They entered the Presence. The expanse Chug crossed to meet them was lawn-like both in size and softness. With an eyeball yardstick and some back-of-the-head calculation, and carpet going for eighty-eight dollars a foot, Mick decided his man had come a long way from linoleum floors in house trailers. "Chug, how's the boy?"

"Mick." Chug offered a hand and a smile learned directly out of Dale Carnegie. "Didn't know you were in town."

Mick shrugged. "I move around a lot." He got his hand back, all fingers still there, and patted his briefcase. "Got something to show you."

They drifted back toward the desk. It was slightly smaller than a Cadillac, that desk, black as a Western bandit's hat, and as clean as bottled water. One multichannel telephone, a two-holer penstand, both holes inhabited, a blotter big enough to advertise Armageddon and make it sell, a letter opener, and an intercom with a gleaming, beady, red eye.

"Not pictures of the family, I suppose," Chug said.

It touched a nerve, but Mick managed not to show it. "Got no time for that, this trip," he said. "Got a lot of big people to see today." He wondered what the letter opener was for. Chasing off insurance salesmen, maybe. "You're first."

The briefcase made a very satisfactory thud when he planted it on a corner of the desk. He snapped the locks and lifted out the congruency machine.

More than anything else, it looked like a samovar, but the resemblance was only approximate. Above a platform of breadboard electrical stuff, a seven-inch metal globe perched on transparent tube stilts. Clamps held the globe's two hemispheres together, and a spigot stuck out of one of them. Wires wound around one of the stilts, climbed up and entered the globe. "What do you think?" Mick asked.

Chug walked around it, inspecting it from every side like an art critic seeing a new free-form sculpture for the first time. Mick wasn't fooled. Chug was the kind that hired experts to put in the flashlight batteries.

"Doodlebug?" Chug guessed. "Haven't seen a new, find-it-anywhere-including-granite-all-the-way-down doodlebug since Slick Willie went to Happy Valley."

"Better than a doodlebug," Mick said. "This particular little black box doesn't just sing 'Happy Days Are Here Again' on top of a road map where the oil is. This thingummy . . . Last time I pulled up at the pumps they wanted four thirty-nine a gallon. And nine tenths. Well, this is going to change all that."

"Not unless you've got the head Arab's most essential part in your pocket, you won't," Chug said.

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"Wait till you've seen," Mick said. While they were talking he'd undone the clamps on the globe. Now he opened it. "Take yourself a look," he said.

Except for an odd piece of glass with wires and solid state stuff inside, the globe was empty. Mick slid his coat off and rolled up his sleeves to the elbow, exposing hairy forearms. "Nothing up my sleeve, and just so you'll not think I'm up to some bottom-of-the-deck deal, I'll let you put it back together."

Chug gave him a measuring look. He'd always claimed he could smell a con deal the way most people could smell the stockyards, and from farther away. "Mick, you're up to something."

Mick shrugged. "If you'd druther, I'll just put it back in my bag and take it down the street. Maybe the boys at Exxon'll give me a listen. But catch me doing you any more favors."

"I didn't say that, Mick," Chug said. He started fumbling with the clamps. "Just wondering what you're up to, is all."

"Stick around and watch close," Mick said.

"Promise? Or was that a warning?"

"Decide when I'm done."

"Fair enough." Chug stood back.

Mick made sure the clamps were screwed tight. Diving back into his briefcase, he came up with a modest-size storage battery which he set down beside the gadget, and hooked up the leads. A power-on piplight lit up. After a moment, some filaments began to glow. Mick backed off. "Now," he said, and pulled an old envelope out of his pocket. He squinted at the pencilled notes. He tapped his teeth. "This building's in the books at nine hundred seventy-six and a half feet, counting the flagpole. What floor we on?"

"Eighty-seventh," Chug said instantly.

Mick jotted a few figures on the envelope. "I make it we're between eight fifty and nine hundred feet up."

"Eight hundred and eighty-three feet," Chug said.

Mick made a note. "And the desk's another two and a half?"

Chug did an eyeball measurement. "Just about," he decided. He looked from Mick to the gadget and back again. "Mick, you're up to something."

"Always was, always will be," Mick said. "Opportunity of a lifetime."

"I should live so long," Chug said.

Mick tipped his head toward the big windows. Standing where he was, all he could see was blue sky. "We're at the northwest corner of the building?"

"Last time I looked," Chug said. "Mind telling me what this is all about?"

Mick scribbled more notes, checked his math, and bent again over his machine. "Got to set these right or it won't do what we want."

"Which is . . . ?"

Mick ignored him. His big fingers made it hard to adjust the close-set knobs. He paused to put on his reading glasses so he could see the settings better. Finished, he went back over what he'd done, checking each knob-set against the notes on his envelope, meticulous as a tax accountant. All the while, Chug hung over his shoulder, fretful with impatience.

"What's it supposed to do?" he asked.

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"Watch close," Mick said. He put a thumb to the button.

There was a faint clink, and the gadget jinked as if lightly tapped, just once, by a small hammer. Then it just sat there.

"Is that all?" Chug asked archly.

"Not done yet," Mick said. He touched the spigot on the globe's side, then drew his hand back. "Oops. Almost forgot. Wouldn't want to wreck the rug."

He got a large laboratory beaker out of his briefcase and put it under the spigot. There was just enough open space on the gadget's platform to take it.

"Remember," Mick said, tapping the globe. "You saw it was empty."

Chug nodded. " 'Cept for that glass and wire thing."

Mick grinned, acknowledging the correction, and opened the spigot. Black stuff jetted out. The smell of hot oil wafted outward.

"Even better than a doodlebug," Chug crowed. "Sure as there's one born every minute, an out-of-thin-air machine!"

Mick looked him stony in the eye. Very slightly he shook his head. "Not this time. It's the real thing, Chug."

Chug tried a laugh on for size. It was a poor fit and he gave it up. Mick never joined. He was disconnecting the battery and stowing it back in the briefcase. The piplight and the filaments died. The stream continued to drool into the beaker.

"You whiffed it, I suppose," Mick said.

"Oh, it's crude, all right," Chug admitted. "Smells like it, anyhow. But . . ." He bent close to inspect, tapped the globe. "It's hollow between the inner and outer wall, and . . ." His finger traced down one of the globe's transparent supports. ". . . maybe there's a tube running up one of these, and . . ."

There was about an inch in the bottom of the beaker now. Mick moved in again and unclasped the globe. It had been about three quarters full and, as the hemispheres came apart, the oil plopped into the beaker like an egg broken out of its shell. Mick stowed the hemispheres in his briefcase.

The oil was still coming. Where the globe had been, a small ball of dark brown fizz sputtered and spat and dribbled a thin stream into the beaker. It went on and on. The beaker now had three or four inches in it. Slowly the level crept up. Chug watched it with a scowl.

Decisively then, he turned. "Neat," he said with a smile; he'd figured it out. "You've got a dingus in the bottom. It's all transparent so it doesn't show unless you look for it, and it shoots a jet up to here—" He stuck a finger close to the fizzball.

"Careful!" Mick chopped Chug's wrist, knocking the hand away. "Don't touch it."

"Oh? Why not? I'd find the trick, maybe?"

"Could hurt yourself pretty bad," Mick said. "Show you in a minute. What else do you think?"

Chug inspected the oil that had spattered onto his fingertip. He shrugged. "Not much more. It jets up, and then it runs back down the outside. And down at the bottom it's picked up and squirted up again. It looks like it's com-

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ing from the top, but it's really coming from down there."

Mick nodded. "Easier to believe that than believe your eyes." He collected the letter opener off the desk and sliced it through the trickle. The fizzball didn't flinch. He brought the blade back and held it directly under the fizzball so that the trickle fell onto its upper side. Thickly the oil oozed down the blade's length and dribbled from the tip into the beaker.

"Still think any of it's going the other way?"

Chug glowered. He was too smart a man to just drop everything he'd ever believed. Or too dumb.

"And here's why you want to keep your hands away." Turning the blade edge-upward and swinging it smoothly, neither fast nor slow, he passed it through the fizzball. As it neared the center, the fizzball squirted several large drops ahead of it; then, as the blade moved on, it squirted several more the other way.

"My carpet!" Chug protested.

"Sorry," Mick said, but he really wasn't. He wiped the oil off the blade with his thumb and handed it to Chug. "See what I mean?"

The blade had a hole through it, pinhead size, perhaps a quarter inch from its centerline. "Same thing would've happened to your hand," Mick said.

Chug looked at the blade. A dentist's drill could have done as neat a job, but not as fast. And there hadn't been anything in Mick's hand. Chug looked at the fizzball and the trickle of oil streaming down from it, and the beaker which now had a good four inches in it. He sighed.

"All right, Mick. Where does it come from?"

Mick grinned. "That's the right question, I guess." He gestured to the beaker. "You'll want to get it analyzed, but what they'll tell you is it's Saudi light. Or ought to be."

Chug scowled again at the little fountain. He went and sat behind his desk, steepled his fingers. "Tell me about it."

Mick found a chair for himself. It had hardwood armrests and a padded seat. He slouched down with his legs straight out. "You're interested?"

"Curious, let's say."

He was interested. Just too stubborn to admit it. "Remember that accident out near Denver a couple of years back? The sort of funny one where they had some kind of a hole that was swallowing everything that got near it, including any air that happened to be around?"

He paused until Chug, sensing some response was required, nodded. "Didn't give it much attention."

"I got involved in it," Mick said. "Never mind how. Maybe they ran out of little Dutch boys, or maybe my finger was bigger. Anyway, I wound up the proud owner of a genuine bottomless hole. I got the idea maybe I could sell vacuum out of it—it really does snarf up everything in the neighborhood—and I wasn't far wrong. My company sells the best bottle of nothing money can buy." He dipped into a pocket and tossed a card on Chug's desk.

NOTHING, INC.

Honest Measure

Beware of Imitations

"We got lots and lots of nothing," Mick said. "More nothing than you'll

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ever want. Empty your wallet, we'll empty your bottle."

Chug toyed with the card. "Most of those lines, I've heard," he said. "So?"

"I had an idea we could expand by running a pipeline," Mick said. "It didn't work out. The farther the pipe's end got from the reservoir, the more . . . ah, impure . . . our vacuum got. The only place we could sell a really good piece of nothing was off our loading dock. But, well, way I figured it, something made that hole, and anything that did it once ought to do it again. So I hired some brain power and put 'em in close proximity to each other for a while, the way you do with rabbits, and what you see over there is the natural increase."

Chug seemed to sink a little deeper into his chair. He'd never been a big man; now he looked like a gnome. "Just a minute, Mick. You said it was a hole and everything was going in. This is . . . it's coming out. And it's all oil."

"That's because this hole's a little different," Mick said. He scratched behind an ear. "Don't know if I can explain it too good. They tell me the universe is pretty much like a two-way mirror, and if you tickle it just right you can make something come through instead of reflect back. Or—" He frowned. Ideas like this weren't easy to get a grip on. It was a lot like not being able to speak the language. "The way they explain it, one part of the universe is just about like every other part, and little things like the distance between one part and another may be just a matter of how we look at it instead of the way it really is. I'd say that was just crazy double talk, only . . . " He gave a glance to the little fountain of oil. The beaker was beginning to look like five inches now. "That's what you get if you start thinking there's maybe something to thinking that way."

Clicking his teeth as if to check the fit of his expensive uppers, Chug gazed at nothing; but slowly he was drawn back to the fizzball and the trickle of oil. "Mick," he said. "You don't believe it and you don't expect me to believe it."

"Believe!" Mick snorted. "I don't *understand* it. But . . ." The oil hadn't slackened a bit. "Anyhow, what the gadget does—this is how they tell me when they're being real patient, like I was a dumbhead, which I am, but it's still me that signs the paychecks so they let me some allowance—it's sort of like a balloon, where you squeeze it together at one place and seal the two sides to each other inside, and then you punch a hole through. So what you've got there . . ." He gestured at the fizzball. "What you've got is a place where two places that are far apart the way we usually think about things, really they're the same place. Now with the accident, what we had was one of these congruencies—that's what they call 'em, right out of high school geometry—a congruency where one place was way out in space somewhere, and the other place was in Colorado, about nine miles out of Boulder. There's a lot of air in Colorado, and the other place there was nothing much of anything, so the air pressure was just naturally pushing air into it in Colorado and it was coming out the other side, wherever that was, where there wasn't anything."

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Some of the idea had gotten through. "And this time . . . ?"

"This time the other side of the hole is someplace under the feet of the camels and A-rabs. My tame brains could tell you where down to the nearest half inch, but I don't think it matters. What counts is that over where the A-rabs are, it's under a few tons pressure to the square inch, and where we're sitting there's hardly any, relatively speaking. So what it comes down to is, well, the A-rabs have done sprung a leak and it's gonna get worse before it gets better. The hole we've got is the same size as the one in your letter opener. We can make 'em any size you want."

"Big ones?"

Mick nodded to the beaker, which was well on its way to six inches. "I could of had you up to your belly button by now, if I'd wanted."

Chug winced at the thought. "Anywhere you want?"

"As long as you can plant the gadget at one end or the other, and you know exactly where the places are. The only other thing, it doesn't work if you try to reach farther than about three quarters of the way to the moon. Something to do with the gravity fields."

"But anywhere in the world?"

Mick nodded. "Lots of things it's good for. Like . . ." He nodded to the beaker again. "Right in your lap, from anywhere. Or, you want a pipeline, you've got a pipeline. Or you want to know if there's oil some place, you just twiddle the knobs and punch a button and—*bzzt!*—you've got the answer. You don't never got to drill a dry hole again. Or a wet one, either."

"You do make it sound attractive," Chug admitted. He rubbed his brow. "Of course we'd want to confirm your claims. Uh . . . it's getting sort of close to the top."

Mick gave the beaker a glance. It still had a good inch to go. "Think how much it'd be if we had a hole with some size to it. And how much are the A-rabs asking for a barrel of top grade, this week?"

"But my desk! My carpet!"

Mick shrugged his indifference. "Think about it. No more tankers to diddle with. No more losses in transit. No more black stuff washed up on the beaches. Delivered right in your bathtub, if that's where you want it, still warm from the well."

"The Saudis would find out, of course," Chug said. "They'd protest. They'd protest most vigorously."

"So? Give 'em your deepest sympathy and tell 'em they shouldn't of put the price up so high it was worth stealing. What can they do? Kick sand in your face?"

"Mick!" Urgent, now. "My carpet!"

There was still a half inch to go. Mick stood up. "Got a trash basket?"

He did, behind the desk where a visitor couldn't see it. Mick dumped it out on the floor and, using both hands, slid gadget and beaker out from under the fizzball and substituted the wastebasket without losing a drop. Leaving the beaker on the desk, he stowed the gadget back in his briefcase. Then he sat down again.

The fizzball was out of sight below the wastebasket's rim, but they could hear its dribble on the bottom.

"Interested?" Mick asked.

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"We'd want to be sure it does what you say," Chug said. He put his hands together. "Your demonstration is very persuasive, but . . . well, Mick, it saddens me to say, but you have a reputation."

"Who says so? I'll sue 'em. Or maybe I'll hire 'em to do my public relations."

Chug smiled a card player's smile. "Mick, I've known you a long time. And I know you don't invite a partner in that you don't need. If there's something you need, you go get it. Now if this device does what you say it does, you could produce the oil yourself and sell it yourself. I'm wondering why you're not doing just that."

"What makes you so sure I'm not?" Mick asked. "If you'll nose around, you'll turn up how much I've been selling for the last six months. Getting a good price, too, considering my cost of production is practically zilch."

"That doesn't answer my question, Mick."

"Didn't say I was answering. It happens, this time, I want some cash money, so I thought of my old buddy Chug Prakken, and I said to myself, Chug's just the boy."

"Mick, you're up to something."

"There's lots of bigger oil companies," Mick said. "Want in on it, or don't you?"

"We'd certainly want to study it, of course. I presume you wouldn't expect a shot from the hip decision."

Mick shrugged. "Sure. Take your time. I got all morning."

"I think we'd need more time than that."

"Such as? I've got an opportunity that needs some big cash money up front. I can give you a bit of time, but I can't just sit on my thumbs while you mumble it. I'll be talking to some other people, and maybe they won't be as careful as you are."

Chug accepted the warning with as much display of emotion as a cigar-store Indian. "It might help us decide if we know what sort of price you have in mind."

"Thought you'd never ask," Mick said. He was going to enjoy this. "We kicked it around back at the shop, me and the boys and the accountants, and to you we figure it's worth . . . we'll keep it a nice round figure . . . ten billion."

The cigar-store Indian looked a bit more weathered. "That's dollars?"

"It ain't jelly beans," Mick said.

"That's our gross profit for three years," Chug said, something like horror in his voice. "Before taxes."

"That's profit you're making the hard way," Mick said. "Buying and selling. With—" he patted his briefcase —"you're getting the product for practically nothing. All you gotta do is sell."

"You can't say your development costs came to anything like that much," Chug objected.

"What's that got to do with it? I got something you want. If the price is right, you buy. If it's not, I go and look for a customer that's got some money in his hand."

Chug looked like he was trying to swallow an egg, shell and all, half hatched.

"That's for the first year," Mick said. "Front money. A . . . uh, re-

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tainer for my outfit's services. After that it's cost of operations plus a half, and three percent of gross profits."

The Indian had just missed all the fun at Little Big Horn.

"That's for oil recovery work," Mick added. "Exclusive contract for oil and natural gas. There's some other applications we want to peddle."

Chug raised himself up to peer over the trash basket's rim. The sound of the oil had muted, now that the bottom was under a half inch or so. Mick didn't bother checking it for himself. Chug sat back down. He folded his hands.

"We'd want some time to think about it," he managed. He gnawed his lip.

"Sure. Take your time. Just remember, I'll be talking to some other people." He got up and collected his briefcase. "You've got my card?"

Chug nodded as if his thoughts were somewhere else. The card lay on the blotter next to the stain that had spread from the blade of his letter opener. Seeing his visitor was about to leave, then, he stood up and started around the desk. As he turned the corner he paused, his eye on the wastebasket. "You forgot to turn it off," he said.

Mick saw the angle of his glance. It wasn't hard to figure. "Didn't forget," he said.

"You're not *going* to?" Incredulous.

Mick scratched behind an ear with his free hand. "Well now, that's something we're still working on."

He saw the puzzlement on Chug's face. The man didn't have to say a word.

"Some day maybe we'll know how to close up one of those connections," Mick said. "Just now, we don't. Look at it this way: you're the only man in Big Oil that's got an operating well right there on his desk. Reminds you what business you're in, sort of."

"But my desk! My carpet! And the smell of it!"

Mick chuckled. "Chug, I can remember when you called that a Texan's aphrodisiac."

Crossing the secretary's anteroom, he could hear Chug—loud—on the intercom. He wanted her trash basket. "Never mind! Dump it on the floor and get it here. It's . . . it's going to . . ."

"Relax," Mick told her. "Plenty of time."

Full of gasses at high pressure, the iron melt blossomed into froth as it came out of the congruency, cooled in an instant, and spat spalling shards in all directions as the pressure of more iron coming through forced the hardening crust to expand. Deep in the clefts between bubbles, redness burned. The room was full of a hot metal stink. Mick wrinkled his nose.

"Straight from the cheapest source," he said. "Think about it. No more mining. No more ore transport. Your smelting costs cut to next thing to zilch. Comes out ready to pour."

Arthur Bascomb, president of General Sheet & Tube, leaned his arms on the desktop and glowered at the rapidly growing mound of shards in front of him. "From the center of the earth, you say?"

Mick nodded. "Not exactly the center. The hired brains say it's rock solid there and what we might get would be sort of an explosive extrusion. This

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comes from maybe eight hundred miles out. Close enough."

Bascomb's shrug allowed the correction as unimportant. "And how does it get . . ." His finger tracked from side to side, vaguely. ". . . here?"

Keeping it simple, Mick explained. It took a while, and by the time he was done the pile of shards had started to overflow onto the floor. Bascomb's attention was all on that.

"Anyway, the how of it doesn't matter," Mick said. "What counts is that it's a raw materials source that's cheaper than any you've got right now, it's delivered where you want it at no extra cost, and it's not all going to be dug out by the middle of next week."

Another handful sloughed off onto the carpet with a sound like a jackpot of pennies. "I have assistants whose whole responsibility is exploration and mining," Bascomb said. "Myself, I came up from the accounting department, and I leave all those problems to my staff. I . . ."

That was the trouble with a lot of corporations. Too many had fallen to the clutch of the bean counters and the tax eagles, men who thought they controlled and guided their businesses, but didn't understand the first thing about the business they were in. "With a supply like this, you'll be able to pension 'em off and still sell the product for less," Mick said. "Foreign stuff'll never undersell you again. Only trouble you'll have is to sell it as fast as it comes out the hole."

Bascomb took off his bottle-bottom glasses and stared blinking at nowhere with oddly tiny eyes. "Ye-es," he said. "I understand that part of it well enough. But of course I'd want to consult them. My marketing people, too, I suppose. It sounds too good to be true."

"Too much like something for nothing, you mean," Mick said. He waggled his shoulders offhandedly. "One of the benefits of mod-ren 'melican know-how, if you can remember what that was. Not that it's a perfect deal. There'll be some impurities you'll want to process out, and you'll still have to make your own alloys, and your foundries and rolling mills'll still have plenty of work." The man was starting to look blurry again. "What counts is, even after you've paid our fee, you'll be getting your product for less than you've been paying. Cheap enough that you can sell it to Japan. Now, if you're not interested, say so and I'll go see if there's somebody else that is. Of course, if they buy in and you don't, they'll be in a position to turn out the product at about half your price, which wouldn't make your stock options worth much. But if that's how you want to play it, you're the boss."

Glasses back on, stony-faced, Bascomb watched the bits of iron spatter down on the mound. "Assuming this is not a clever trick, that's hardly a choice," he said. "I believe you mentioned a fee."

"Ten billion," Mick said, and when his man blinked as if with pain he sketched out the terms. Bascomb tried to look impassive, but Mick saw him wince several times.

"Isn't that rather a lot?" Bascomb asked when Mick was done. "I mean, it would appear to be a rather simple process."

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"A tooth looks simple till the dentist starts working on it."

"Well, yes. But . . . but . . ."

"It's like knowing where to put the chalk mark," Mick said. "You think our gadget only costs a bit of small change at the corner drugstore? Two boxtops and twenty-five cents to cover postage and handling?"

"But even so . . ."

"And we'd like to have something left after the tax mob's skimmed it," Mick said. That, at least, was something Bascomb would understand.

"But so much. So much."

"What would you pay for a year at Fort Knox with a shovel?" Mick asked. "Look. Considering what it is and what you'll get from it, that's cheap."

"It's not that simple," Bascomb protested. "Our production cost includes all sorts of investment in production facilities. Those costs won't just vanish because we've changed our source of supply. Here: just for example, we own seventeen ore boats in the Great Lakes. Not one is fully depreciated. We have long-term leasing arrangements on nine more. This . . . this magic trick of yours—"

"It's no trick," Mick said.

"Perhaps," Bascomb snapped. "Nevertheless, whatever it is, it would render those ships obsolete. And they would be virtually useless for any other purpose. Yet the costs of having built them or leased them would continue whether we continued to use them or not. Not to mention the taxes. Similarly with our mining equipment—our costs of developing the mines themselves! And our taconite plants! Our furnaces! We have millions and millions tied up in that equipment."

"Swallow hard," Mick said. "One way or another, you'll have to write those costs off. If you don't, you'll have the bankruptcy court doing it. Now, are you interested in the services we're offering? Or are you interested?"

Bascomb subsided into his chair. "I think, before I make any sort of commitment, I should consult with my staff."

Mick shrugged. "Fair enough. Just show 'em my little demonstration there and tell 'em the deal. And while you're doing that I'll take a stroll down the street and talk to some people. Lots of people going to be interested in a deal like this."

On his way out, he glanced back once. Bascomb was still slumped behind his desk, watching the mound of iron shards slowly build. He looked very grey and very old.

Back at his hotel, a message slip was waiting. Chug wanted him to phone. Mick stuffed the note in a pocket and went to lunch. If Chug wanted him bad enough, he'd call again. If it was urgent, he'd have somebody go sit in front of the door.

She favored her mother, Terry did, which was just as well considering what her father looked like; not that he'd looked like that when he married her mother, but he'd not been exactly a Greek god, either. Lacking words, Mick fiddled with his pipe, packing the tobacco tight without getting it too tight, then cracking the head off the kitchen match with a thumbnail and dabbing the

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flame over the pipe bowl until it was burning evenly. He made no move to pick up the menu the waiter had left beside his napkin.

"Dad . . . ?"

"Uh?"

"Ma said to tell you you work too hard."

"So? What else I got to do?"

Her head tilted just enough to say she'd thought about it and she had some answers. "Go fishing? Lie on a beach someplace? Tennis? Golf?"

"Calling it something else doesn't make it not work."

"Lying on a beach? That's work?"

"For me," Mick said, "it's work. That all she's got to say?"

"No. But that's all I'm going to tell you." She'd got a job with a trade journal that focused on manufacturing processes. She didn't use half of what the university had taught her about engineering because nobody, to look at her, thought she'd want to dirty her hands. But she could tell the difference and relative advantages between casting and extrusion and sintering; cermets and plastic, paper sandwitches, and a thousand alloys; and when a word processor developed jittering logorrhea four hours before an issue went to bed, she troubleshot it herself, patched a compatible (but better) chip into the circuits, reprogrammed, and finished the assignment with forty-three minutes to spare. Time enough to do her nails.

The waiter came back with her sherry and his double Irish. He ordered the stuffed pork chops; she ordered a salad.

"Dad, you're up to something," she said when the waiter had gone.

"Always was. Always will be. Who says so?"

She made a flutter of the fingers that conjured up a vision of butterflies. "It's all around, like water to fish."

Mick humphed. "Well, if everybody says so, must be they know something."

"All they know is they don't know enough. They're wondering what it is."

"You included?"

"Of course me included. I'm the one everybody asks."

He sampled his Irish and thought about it.

"Well?" she prompted.

He shook his head. "If it works, you'll be the daughter of the richest man in the world. You won't have to work for a living."

"I don't," she said. "Dad, why bother? You've got enough. You don't have to wheel and deal. All the trouble you have with Ma, that's the reason for it."

"Sit in a lawn chair and clip coupons?"

She'd started to pick up her wine glass; she put it down again. "Dad, you send Ma her check every month, and it's more than she knows what to do with. She sends me some of it. And *you* send me a check. You don't need more than you've got. What do you want any more for?"

"You said you don't need to work," Mick said. "So why do you?"

She started to speak but no words came out. She leaned back, composed herself, tried again. "I guess mostly to show I can do it." She spoke as if it was a truth she'd never looked in the eye before.

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Mick nodded, smiled. "Should I be different?"

She was quiet a moment. Her hand reached for her glass, but she did not take it up. "I think that's what Ma was talking about," she said.

Mick grunted. There was a nerve there he hadn't known he had. "Tell your ma a leper doesn't change his spots. They just get bigger."

His fame had got to the offices of Transcontinental Light and Power ahead of him. When Mick was admitted to the Presence, two grey, hollow-jowled men were waiting with Spencer Fiske. All three watched with wary suspicion while Mick assembled his dingus on the collapsible plant stand he'd brought. When it was ready he straightened up. "Got a wastebasket?"

No status-conscious executive would admit to lacking one, though Fiske's contained only a few scraps off a doodle pad. Mick inspected it; hand-tooled leather, or a very good imitation. Good solid bottom. It ought to work just fine. Holding it out to one of the underlings, he said, "Put some water in it. Three quarters full."

The man had already accepted the basket. Now he looked blank.

"Water," Mick repeated. "W-A-T-E-R. Wet stuff. People wash their hands in it. Take baths. Some people drink it when there's nothing better."

"Mister Fiske?" the man appealed.

"The washroom's just down the hall, George," Fiske said. As George went out, Fiske turned to Mick. "Perhaps if you'd explain what you intend to show us . . ."

"Rather just show you," Mick said. "That way we don't argue how much you saw and how much I told you to see."

Fiske's only response to that was a stony eye. The silence held until George returned with the wastebasket. It sloshed and slopped and dribbled on the carpet.

"I think it's leaking a little," George said.

"That's all right," Mick said. It wasn't his carpet. He turned a thumb toward the open space between the legs of his plant stand. "Right there," he instructed.

George looked to Fiske, who only nodded. Getting down on his knees, George tried to work the basket in between the plant stand's legs. Finally, Mick took pity on him and lifted the stand and set it down again straddling the basket. George blinked up at him; himself, he'd never have thought of it.

For Mick it was back to work. With a plumb bob and a tape measure he set to checking what his vector and distance settings should be. Just to be sure. He made a show of it. While Fiske and company watched in dumb silence, he scribbled figures on the back of one of the doodle pad sheets and did more arithmetic than was absolutely necessary. "What's twenty-three divided by seven?" he asked. He scribbled some more. "Never mind. I got it."

He checked his figures against the dial settings. He fiddled with one of them, then checked the doodle pad sheet again. Only when he had everything perfect did he hook up the battery and punch the button. Anticlimactically, nothing obvious happened.

"Well?" Fiske asked.

Mick opened the spigot. After a mo-

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ment a dribble of water came out. It splashed on the plant stand's framework and spattered on the floor. Mick ignored the protests. Quickly but with care—a live congruency wasn't something to get careless with—he disassembled the enclosure sphere, then the dingus, and finally the plant stand. All that remained was a thin stream of water from a point in midair down into the wastebasket. Mick cupped a hand under the stream long enough to show it really was coming down from above, that it wasn't a jet coming from below. Some splashed on the carpet. With the same hand, still wet, he produced a large pellet from a pocket; it turned his fingers purple. He flipped it into the wastebasket. "Dye," he said.

Fifteen seconds later, starting from the top, the water in the stream turned purple.

"All right, you've seen it," Mick said. "What we call it is a congruency, and what it means is there's a space down there in the basket that's the same as the place up here. Down in the basket it's under about a foot of water, so the water pressure's forcing it in down there, and it comes out up here where there isn't any pressure. If we had some pressure up here . . ." He paused. "Got another wastebasket?"

After a scramble, they came up with one from an anteroom. Mick held it under the stream to catch the water before it could return to the one on the floor. He nodded to George. "Hold it right here for a while," he said and let him take it.

The second basket slowly filled while the level in the basket on the floor went slowly down. His audience watched as if waiting for a fish to jump out. After a while, the stream became a dribble, then a steady drip, then stopped. Casually Mick wandered over and peered into the one on the floor. "The level's down below the congruency," he explained. He tapped the basket's rim, setting up waves of water. A few drops dripped from the upper congruency point. "Still there, though."

He took the basket from George and lifted it to engulf the upper congruency point. The basket on the floor began to fill again, the level quickly rising to cover the odd knot on the surface of the water out of which the water flowed.

Mick raised his basket higher. The congruency punched a hole in the bottom. Water escaping through the hole intercepted the congruency and vanished while the level in the basket on the floor continued to rise. After a moment, an equilibrium having established itself, the flow from the basket on the floor to the upper congruency resumed, while the stream from the basket Mick was holding added itself to the downward stream. Mick emptied his basket into the one on the floor and stood back. The downward stream from the upper congruency stood alone, sourceless, without visible means of support.

"Like it?" Mick asked.

Fiske's expression was half scowl, half frown. "An interesting stage trick," he said at last. "But I understand you had a business proposition to offer."

Mick nodded. "You're looking at it."

"I don't . . ."

One of the aides—not George, the other one—leaned down and muttered

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something into Fiske's ear. Whatever he said served to deepen Fiske's scowl.

"You can do it with water, or you can do it with something else," Mick said. "Anything else. If you want, you could dump sand in buckets and run 'em on a chain. The thing is . . ." He interposed a hand into the stream of water, making it splash on the carpet. "You've got energy here. You could run a small motor off as much as this is putting out right here, or maybe a couple of light bulbs. Instead, you're getting your rug wet."

Ear cocked as if listening for subliminal resonances, Fiske tapped a thumbnail on his desktop. "Suppose we have something clear," he said. "Are you seriously advancing this . . . this trick as a system of power generation?"

"Any reason I shouldn't?" Mick asked. "Just for example, suppose you've got a hydropower dam that if you used it to put out all the juice you wanted, you'd run the reservoir down faster than the river fills it again. With this little gadget you can pull the water back up from below and use it as many times as you want if it doesn't evaporate first. You don't have to worry about how to keep the reservoir full. Shucks, you don't even need the dam. You could build a tower next to the river and have the water coming out at the top and running back down to the bottom; stick a turbine down at the bottom and you're ready for business."

"But that's impossible," one of the aides—the one who wasn't George—protested. "The laws of conservation don't . . ."

"Since when did they pass that law?"

Not-George spluttered. "You can't. You just can't!"

Mick stuck his hand into the stream of falling water. Drops splashed in all directions. "Can't I?"

Fiske winced. "What he's saying is, the law of conservation of energy doesn't permit what you describe."

"Well ain't that just too bad," Mick said. "Somebody going to write me a ticket? Sing Sing? Alcatraz?"

"There's something utterly preposterous here," Fiske said.

"Yup," Mick said. "What you're looking at here's an eternal juice machine, and you're saying you don't see it. More than that, it's a free ticket into the twenty-first century. No more A-rabs or coal miners or environ-a-mentalists or Eskimos to say if we can burn the candle or what the price is. Just what the Great White Fathead in Uncle Country's been down on his knees every night and most afternoons asking for. And there it is, bright and shiny, right in front of your baby blue eyes. Never mind what's legal and what ain't. With a thing like this you can afford to write your own laws. Who do you think you are? The three wise monkeys?"

Three pairs of eyes looked at him dumbly. He let his breath out with an audible sign. "Well, OK. I'll just leave this little demonstration here to remind you, and when you make up your mind it's the real potatoes you can give me a call." He flipped his card on the desk and turned to leave. With the door shouldered open, he paused. "How about I just sell you the juice, and never mind how I got it?"

In slow silence, Fiske traded glances with his men. He wore the look of a

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country boy near the end of his first snipe hunt, not yet completely sure he was had. "We prefer to produce our own," he said cautiously.

"Even if I sell it cheaper than it costs you to make?" Mick asked.

"Our cost per kilowatt is the lowest in the industry," Fiske said.

"Was," Mick said, and let the door swing shut behind him.

When he got back to his hotel, every light in his room was burning. Their blaze struck out at him when he opened the door. He stopped on the threshold, not moving. He might have left one or two lighted, but not all those.

"It's all right," said a voice. "C'mon in."

The man who had spoken was slouched in a chair at the room's far end, middle-aged and sedentary looking. Looks could fool, though. Mick stayed where he was.

"Friend, I don't know what your business is," he said, "but I want you to know all my plastic's got a picture of me on it, I got a dime to tip the bellboy, and I bought my watch in a drugstore."

The man got up slowly, as if it was something he did as rarely as possible. "Not here for your wallet," he said. "Michael Candido?" As he spoke he was crossing the distance between them. He had a belly that looked to have recycled more than a few quarts of beer.

"If it's business, ask my secretary for an appointment," Mick said.

By then the man was almost at arm's reach. Mick had kept the door open with his heel, and he was ready to hurl himself out into the hall when the man produced a wallet from inside his jacket, flipping it open and holding it out for Mick's inspection. Instead, Mick looked the man straight in the eye through a very long silence, taking his measure. Only then did he carefully fumble out his glasses, make a show of adjusting them on his nose, and closely peer at the credentials offered. All the while he kept his heel against the door.

"Says right here you work for me," Mick said.

"Uh?"

"Courtesy of the Bureau for the Infernal Ravenous," Mick said. He peered closely at the name. "Herbert Halberstadt?" he pronounced experimentally.

"Close enough," Halberstadt said. "We, uh, thought it might be best to talk with you informally. For a start, anyway."

"That's why I didn't hear you knock? Just you and me and the bug in the light fixture?"

Halberstadt had the decency to look sheepish. "It wasn't my idea. I only do what they tell me. Look, can we go sit down?"

Mick tossed a glance to the armchairs at the room's far side. "Over where the bug can pick us up better?"

"It can hear us anywhere," Halberstadt said. "It's my knees. Can't stand up as long as they used to. They hurt."

"Too zoon oldt, too late schmardt," Mick shrugged. He could sympathize with that. He let the door come shut behind his foot and, brushing past Halberstadt, plunked himself down in one of the chairs. More slowly, Halberstadt took the other.

Mick got out tobacco, pipe, and fixin'

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equipment. "All right. What's Uncle want?"

Halberstadt cocked his head. "Let's say we've taken an interest in your activities."

"Do I get a right to remain silent? Make a phone call? Have a law boy present?"

"We're not charging you with anything. We—"

"That's nice to know."

Halberstadt gave him a look of annoyance. "We want you to know we're very carefully watching what you do."

"Then you'll see me do it very carefully. Maybe I should sell tickets."

"We don't think it's something to make jests about," Halberstadt said. "There're some serious questions about what you're doing."

"If you've got questions, ask," Mick told him.

"Not that kind of questions," Halberstadt explained. "What we've noticed—not officially, you understand—it's been brought to our attention that you've been offering a . . . call it a delivery service. We . . ."

"What I'm selling, I've got," Mick said. He held up a tight-gripped fist. "Mine. Right here. If they think I don't, they don't have to buy."

"We've investigated," Halberstadt said. "Our information tends to agree with what you claim. Whatever you're doing, we have no reason to suspect fraud. That's not our department, anyway. What we're concerned about, from each bunch you've talked to, you've asked a price substantial enough to operate a small country for ten years. Taken together, it adds up to several percent of the gross national product."

"Some of 'em might not buy," Mick said. "Maybe none of 'em."

Halberstadt nodded. "A possibility."

"If they don't, there's nothing to stop me going into the business myself. They know it. Maybe they'll stand on one foot for a while, and then they'll stand on the other. They'll buy. Or sell out."

"That's about how we see it, too," Halberstadt said. "And what we're worried about, that's going to give you more control of the country's economy than it's good for one person to have."

"Not counting senators, congressmen, and presidents?"

"They're sensitive to the needs of the country," Halberstadt said. "We're less sure about you."

Mick looked down at his pipe. Without him paying attention, his hands had packed it ready to light. Now he took his time about getting it lit. Halberstadt could wait. "Trying to jawbone my price?" he asked. "Greedy industrial baron squeezes blood from the pocket of John Consumer and all the orphans 'n' widders?"

"We don't say it. You did."

"I was quoting from the politician's book of common prayers," Mick said. "Ceremony to be performed two weeks before election and frequent intervals between elections. Now, just for a minute, let's look at the other side of it."

"What other side?"

"Well, to begin with, that parlor trick I've been showing cost something more than half a dollar to put together. It ain't no tinkertoy. It's a con-sidera-bobble investment which I've got to earn back on account of otherwise my accountant won't speak to me." Mick ticked off a finger. "That's one. Number two,

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what they're buying's going to make them money for years and years and years, for not much more work than shovelling it in their pockets. You're saying I ought to give 'em a free ride?"

"No comment, Mr. Candido," Halberstadt said. "We are not authorized to inquire into your pricing policies."

Mick's reply was a sour look. "Three, it's not a smart thing to let everybody into the act. Those holes are a dangerous thing. You want a four-foot hole pouring liquid iron at a few million tons per square inch pressure, twenty-four hours a day plus coffee breaks, and nobody handy to put in the plug? It's like having your own private volcano. The only way to keep the lid on is make it expensive."

"That's not our concern, either," Halberstadt said. "If it's a safety matter, talk to OSHA."

"And finally," Mick went on, bulldozer style, "I've got some projects cooking that'll eat up money like a barracuda's breakfast."

"Such as?"

"I thought you already knew everything," Mick said. "If it works, you'll read about it in the papers. If it doesn't, easy come, easy go. Meantime, it's for me to know and you to find out."

"We just might do that," Halberstadt said. "Of course you know how disruptive that much money can be, all in one pair of hands."

"You scare me," Mick said, unmoved as stone.

"We might have to take measures."

"Such as?"

"Understand, this is all unofficial."

"Sure," Mick said. "You're not really here. I've got a powerful imagination. Got something particular in mind?"

"Anything we might do would be entirely within the limits of the law. You've got lawyers. Ask them."

Mick studied him for a while. "Things you don't have to do, but you've got a law that says you can. That's it?"

"We've got a lot of those," Halberstadt said.

"You'll try to bury me in paper. You and your lawyers."

"I didn't say that." It was what he meant, though.

Mick sat, not speaking, so long that Halberstadt was compelled to fill the silence. "You get the message?"

"Who's your boss?" Mick asked. When Halberstadt didn't respond, he said, "Who gives you orders?"

Halberstadt told him.

"Washington?"

Halberstadt nodded.

Mick leaned back, folded hands over his belly. "Tell him to be at his desk tomorrow morning at seven-thirty, because that's where I'm going to be."

Halberstadt glanced at the window; it was getting dark outside. "Isn't it sort of late? I don't know if I can . . ."

"It gets dark early this time of year," Mick said. "And it's a long day tomorrow. Now scram. I gotta pack."

"How did you get here?"

Mick dragged over a chair without being invited and sat down. He stuck his feet out. "Well, let's see. I took the Amtrak down last night, and then I took a cab from the hotel. You got any idea what a taxi wants these days? And a tip on top of it? The rest of the way I walked."

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"Uh, that's not exactly what I mean," Drew Gleason said. He worried his lip. "What I meant was, well, I instructed my staff to find out your problem and report. I . . ."

"In other words, keep me out of your hair." Mick made a show of surveying Gleason's almost barren scalp.

"My staff is much better able to deal with practical matters of detail," Gleason said. Elbows on the desk, he put his hands together, fingertip to fingertip. He examined the configuration to assure himself the fingers were properly matched. "It leaves me free to consider matters of policy."

"Like job insurance?" Mick asked.

"That isn't the jurisdiction of this office," Gleason said. He adjusted his glasses. "But what I was saying, I wondered how they had failed to . . ."

"Didn't pay anybody, if that's what you mean," Mick said. "But if this was a turkey farm—and I'm not sure it ain't—there'd be a lot of ruffled feathers."

"What I had in mind, actually," Gleason said, and took off his glasses and polished them on an almost clean handkerchief and put them back on, "I was wondering if this invention I understand you've been . . . uh, demonstrating . . . if you'd used it to get past . . ."

Mick waved him quiet. "It's no good for moving people."

"Oh? I'd have thought that would be one of its most obvious . . ."

"If it worked a little different, maybe it would," Mick said. "We put a mouse through it, and all we got out was a handful of goo. Something about the discontinuous interface—that's what my smart boys say—whatever that is. Breaks up what you put through into little bitty pieces." He rubbed thumb against finger, as if there was powder between. "That small. There's things you can do with a thing like that, but moving people around's not one of 'em."

Gleason had his glasses off and was polishing them in a way that made Mick think of a bartender when business was slow. "Well now," Gleason said, "this is very interesting, but I'll have to admit I'm not very equipped to appreciate the technical aspects. Nor is that what we're concerned with. Our concern, as I think you've had explained to you—unofficially, of course—is the economic impact which your method of introducing the device will unavoidably cause."

"Have I broke any laws? Regulations? Promises?"

"We're still studying that, Mr. Candido."

"And I'm supposed to not move till you're done?"

"So long as there are no violations, you're free to do as you wish."

"I've got your permission?"

"It isn't a matter of permission, Mr. Candido. No citizen needs our permission to do anything he wishes. Neither can any charges be brought until something has been done which constitutes a violation."

"But if I step out of line, you land on me with both feet?"

"You or any citizen who breaks the law, Mr. Candido."

"And you go out of your way to tell all of 'em?" Mick asked.

"Those we think might need to be reminded, Mr. Candido. We'd prefer that no one violated the law."

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"Nice of you to think of me," Mick said. He looked at his watch. "Suppose you tell me just what's your complaint?"

Gleason drew himself up. "I have already told you, Mr. Candido, that as of this moment we have no specific complaint. We foresee the possibility of a complaint arising, and would prefer to avoid the necessity of taking action after the fact."

"Say it different, then," Mick said. "What don't you like about what I'm doing?"

"Several things give us concern, Mr. Candido." Gleason began to count on his fingers. "You're asking a very high retainer fee. So high it would strain the financial resources of some of the industries you've approached. Yet, if they do not retain your services, competition from companies that have availed themselves would probably destroy them."

"Now look at my side of it," Mick said. "I need the money for . . . well, a project I got involved with, never mind what . . . as well as to get back the costs I've poured into this one. And selling something's a better way to get cash than the friendly finance company. Interest rates eat you alive."

Gleason's mouth twitched at one corner. "And you would be amassing at one stroke a significant fraction of the gross national product. Both the act of diverting such an amount from its usual channels and to concentrate so much in one man's hands to invest or spend according to his whim would give you a measure of power difficult to imagine and dangerous for any one man to have."

Mick knocked his pipe against the edge of Gleason's desk, catching the wad of half-burnt tobacco in his other hand. After a moment's search for a place to dispose of it, finding none, he dumped it into Gleason's empty OUT basket. "Before you complain too loud, think about how much of that'll get grabbed for taxes. Any other business, paying that much'd make me a major stockholder entitled to a seat on the board of directors. As for the rest of it, like I already told you, I've got places to spend it all lined up."

"Our concern is the nature of those places. We . . ."

Mick finished lighting his pipe and checked his watch again. "Better answer the phone."

It hadn't made a sound. "I don't . . ." Suddenly it rang. Gleason froze.

"Answer it," Mick said.

Gleason picked it up with as much pleasure as he would a lizard. "I gave instructions I wasn't to be . . . Oh, hello, sir! Is it important? I . . . Oh, yes, sir. Certainly, sir. . . . I understand completely, sir. May I log this call, sir? . . . Of course you realize I have to protect my position, sir. The integrity of my department is . . . Well, could I have a memo to that effect? Oh, of course. Certainly, sir!"

He hung up and, for several silent moments, scribbled shorthand notes on a pad. Finally he sat back, put his fingertips together. "It would seem my warnings may have been premature."

"Could of told you that," Mick said.

"At the same time," Gleason went on, edge-voiced, "I would not want you to think we will not continue to monitor your activities. Neither will we fail to add to your file whatever information

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comes to us, regardless of source. That would include, of course, the outcome of our conversation here. By itself, perhaps, it may not be significant. Taken with other information, though . . ."

"Why not say what you think?" Mick said. "You think I bought myself some people that wasn't supposed to be for sale."

"That's saying it rather more baldly than I would prefer. However . . ."

Mick hugged himself with secret glee.

"I must say," Gleason complained, "I don't understand what's so amusing."

Mick was still laughing quietly to himself. "Maybe you should of asked them. They think they bought me."

"He took it like the ostrich that swallowed a coke bottle. You could watch it go all the way down," Mick said. Ankles crossed, coat thrown wide, he slouched in the conversation area of Aaron Krafft's office. The window gave a glimpse of the Washington Monument and a few bare tree branches.

"Hadn't any choice," Aaron Krafft said. He had his glasses off and was pinching the bridge of his nose. "When Olympus growls, the rabbits start running. But don't think you made any friends. They can keep a hate warm over there through seven winters and an ice age."

"I'm not out to make friends," Mick said. "I got a stake to raise and a operation to put together. Two operations."

"Maybe to you that's enough excuse," Krafft said. "Not to them."

Mick waggled a finger. "To them my excuse is it's not their business. They leave me alone, I'll give 'em nothing to worry about."

"It's their job to worry," Krafft said. He leaned back. "You'll remember we advised against the approach you've taken. We . . ."

"You said it was up to me to raise the cash," Mick reminded him. "You said if I set up a company and tried to sell shares, I could hawk 'em night and day and they'd still nobody buy—and I'll have to say if it wasn't me behind the deal, and I know what I've got, I wouldn't buy a slice of it either. And when I said I could go and sell power and oil and iron, and . . . and the Amazon River to Los Angeles, and pile up the cash that way, you said that'd bring it in too slow, and besides I'd be killing all the heavy industry and half the construction in the country. You were diving for cover so fast you forgot to ask if there was any water in the pool."

"All we said," Krafft said, "was that we'd accept no responsibility for how you raised the money."

Mick nodded. "Yup. You're just the piano player."

"Our point was that your . . . ah . . . ?"

"Contributors, I call 'em," Mick said.

"Call them anything you like," Krafft said. "When they find out what you've been doing, they're going to believe you misled them. And, come to that, we'd have to admit there was some justification for them thinking that."

"Yeah. Well, time enough to worry when they start to holler."

"My point is, you know they're going to."

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"And when they do, I'll take care of 'em."

"They'll want your head on a plate, Mick," Krafft said.

"No they won't," Mick said. "Blood you can't put in a bank and write checks on. What they'll want is money. They'll want all I got."

"Well, that's bad enough, isn't it?"

Mick shrugged. "Would be, if I had some. By the time they get that far they'll find out, like a dummy, I spent it all."

"That's not going to make them happy," Krafft said.

"So? What'll they do about it?"

"They could bankrupt you," Krafft said. "Slowly."

Mick shrugged again. "I got worse things to worry about. I'll be bankrupt if it doesn't work. *Not* slowly. And it could go that way. My hired brains are taking bets."

"They're not sure themselves?"

"They're not sure they put their shoes on the right feet this morning," Mick said. "When I tossed it to 'em, they started yelling at each other like a bunch of monkeys for the last banana. Next thing I know, they're slapping dollar bills on the table." He chuckled. "Put down a bet myself."

"Oh?"

"Ten clams against," Mick said. "That way, if this thing flops, I'm still a winner."

"Mick," Chug said, "you're a hard man to track down."

Mick shifted the handset from the hand he used to answer the phone to the one he used for listening. His left ear was the good one. "Didn't stop you, I notice."

"There's people on the payroll for that kind of work. Took 'em four hours. Used to be I could drill three hundred feet in that much time."

"Not through baked mudstone at five thousand feet you didn't."

"If it's hard to drill, I don't drill. Let the wildcatters do it. That's why I'm rich and they're not."

"And the reason you're calling," Mick said, "you plan to stay that way."

For a moment there was silence on the line. "Well, you know how it is, Mick. Something new comes along, you either keep up with the world or get left behind. If it means you write off some investment, you write off some investment. It hurts—I want you to know that, Mick—but not getting aboard would hurt a lot worse. But I'll warn you, Mick, you better be ready to deliver."

"You've got the cash?"

"Uh . . ." Chug's voice took a different note. "I've got some people lined up. Together we've got it."

"What about the shareholders in the company you've got already?"

"My corporation is a member of the consortium," Chug said. "And some of my bigger fish are also participating as individuals."

"And the widows an' orphans?"

"Join the twentieth century, Mick. There aren't any widows and orphans any more. It's all pension plans."

"Seems to me you was one once," Mick said. "So was I."

"That was a long time ago, Mick," Chug said. "And a long way from here." Then, with just a touch of an-

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xiousness, "You haven't signed up with somebody else, have you?"

"I sent you a draft contract yesterday," Mick said. "Read your mail."

A moment's silence. "You were that sure of me?"

Mick chuckled. "Chug, I used to know a man that looked just like you."

"It better deliver just like you say," Chug warned. "Or I'll have you counting stones in the wall around Leavenworth the rest of your life."

"Might not be so long," Mick said. "Don't worry. Just tell me where you want it, and how much."

She was slow to answer the phone. He almost gave up, but then she came on the line. All the things he'd planned to say were suddenly gone from his tongue. Ache, need, anxiety colored his voice. "Charli?"

"Mick?" Her breath caught. He could hear it. He waited. Two thousand miles of wire whispered.

"What do you want?" she asked.

Outside his hotel room's window, fat snowflakes were slowly coming down. He watched them while another part of his being spoke. "You mean I can't just call up to say happy Thanksgiving?"

"Mick, I know you."

"Then you know what I want."

"Anything that's not nailed down. And some things that are."

It was going badly. He'd known it would, but he'd hoped it would not. "Did I ask for anything yet?"

"You don't have to. You think all you have to do is call up on the flimsiest excuse, and you think I'll . . . The trouble with you . . ."

He sighed. "The trouble with me, I go for things I want. What I think's worth having. And I try to hang on to 'em. Because I think they're worth hanging on to. Even if it's something that's not there any more."

"That's right, Mick," she said in a voice like chrome steel. "Here's something that's got away."

From where the jeep dropped them off it was a short walk to the old viewing stand. The concrete was pitted, cracked, and stained. After years in the salt air the steel showed deep rust where the paint had flaked away. Restlessly, Mick stumped around. He scuffed bird droppings and wind-sifted sand. Far off across the lagoon, the launch vehicle looked about as big as a new-sprouted bean shoot. He went back to where Aaron Krafft leaned on the rail. "You mean we got to stand this far back?"

Krafft didn't even straighten up, didn't look at him. "At this distance, if she explodes, we'd get badly scorched," he said. "Any closer and they'd cancel your insurance."

Mick brushed grit off the warped, split wood of the bench behind them and sat down. "Only insurance I ever had was to know when to start running and not worry much about if I should stop." He dredged his pockets for pipe and fixin's.

"You could of had a watch slot at Launch Control," Krafft reminded him.

"With a TV screen," Mick said. He reamed out the bowl of his pipe, banged it on the edge of the bench, and reamed some more.

"That's as much as most of the launch personnel have," Krafft said.

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"Actually, the screens give a better view."

"And who knows what they're plugged in to?" Mick asked. He pointed his pipe at Krafft like a loaded gun. "For all I know, what I was watching could be out of Walt Disney Studios. Me, I'm the who that's buying this party. If it dies, I want to see it die in natural living color."

The foghorn cleared its throat. "FIVE MINUTES AND COUNTING," it blurted.

"My dollars," Mick grumbled. He stuffed his pipe full of tobacco.

"It was your idea," Krafft said.

Mick made busy lighting his pipe. "If it works, it'll work big. If you people splash it, I go back to driving a Chevy pickup with three bad fenders and a crate of nitro back by the tailgate. I'm too old for that kind of work."

"Mick, you're exaggerating."

"Well, two of the fenders weren't very good."

"That's not what I mean, Mick."

"I know it's not what you mean. I'm telling you anyway."

"You know we want this to work as much as you do," Krafft said.

"Just so you remember, I'm who's buying."

"FOUR MINUTES AND COUNTING," the foghorn said.

"It'll solve all our problems," Krafft said.

"If it doesn't splash," Mick said. "If it works like we hope. Get us a whole new package of 'em, anyway." Sipping smoke from his pipe, he looked skyward; blue sky and a few wispy smears of cloud. High up, a buzzard wheeled on slow patrol. "Stick around," he muttered. "You'll get your chance."

"THREE MINUTES AND COUNTING. WE ARE GO FOR LAUNCH."

"Just gotta be patient," Mick said, still watching the bird.

The first part of the operation went unnoticed except by a pair of Russian cosmonauts in a Salyut. A bright star behind the Moon, they said. One day and twelve orbits later, they said it was still behind the Moon.

The astronomy people wrestled with that for a while and decided it was a comet. Then someone realized it had to be in the number-three Lagrange position and they decided it wasn't a comet. Couldn't be. Or anything else. Lagrange three was so slippery it couldn't hold on to a spoken word if it had an eyebolt attached. They didn't know what it was.

Krafft got Mick on the phone. "We're putting out the press release," he said.

"That's nice," Mick said. With his toe he pulled out the bottom drawer of his desk; he stuck his foot into it and leaned back. "Which one?"

"The one about a private corporation studying ionized particles from the sun," Krafft said. "It has the advantage of being true."

"Like Custer saying he'd met some Indians," Mick said.

"You'll probably have some questions coming your way," Krafft said. "We want you to remember something. We sold you a launch vehicle and the tracking and guidance services. We're not active participants. That's official, and it's absolutely true."

"I think I can remember that," Mick

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said. "No trouble at all. Especially at the stockholders' meeting."

"It's going to work?" Krafft asked.

"That part of it has," Mick said. "Now if we can snatch it down here *and* keep a lid on the bottle, we'll have us a thing that walks and talks. My hired brains are happy as flies in a honey pot."

"It's holding right at the zero-G point?"

"Like a wildcatter at his line of credit," Mick said. "My boys say it's the advantage of a thing that's mathematical 'stead of real. Wouldn't hang up there like that if it was something real, they tell me. *Now* they tell me. Fact is, they say every time it jinks or wobbles it tells 'em something about the distribution of mass in the solar system and maybe the universe, which makes 'em happy as a bunch of injuns at the distillery. Nutty thing to get excited about."

"When do we move to stage two?" Krafft asked.

"What you mean 'we', white man?" Mick asked. "Be a couple of weeks yet, my guess. Maybe more. These brain-power guys would walk babysteps barefoot on hot waffle irons. Say I got to do it careful."

"Well, they're right, aren't they?"

"Ever try to pick up a rattlesnake that way?" Mick asked. "Careful's one thing, timid's another."

"If it goes wrong, you'll more than just get your fingers burned."

"All the way up to the collarbone. Yeah, I know. Doesn't make it easier, sittin' and watchin' 'em diddle."

"Just have to be patient, Mick."

Mick sighed. "I got some advice. Don't hire nobody smarter than you are. One way or another, they wind up running the business. Coming down for the fish fry and barbecue, if it ever happens?"

Krafft's voice turned suddenly careful. "I think not. That's something us government people better stay clear of. We'll send a liaison, of course, but . . ."

"Somebody expendable?" Mick suggested. "Some guy that said 'not my department' when he should of waffled?"

"Well, you'll have to admit there's some risk involved."

"There's risk getting out of the bathtub," Mick said. "Look, if that's all the reason you'll stay away, my brains say the worst possible case would have you fried in about fifteen minutes, 'stead of right away. Europe, it might be about three quarters of an hour."

"Somehow, I find that less than reassuring," Krafft said.

"Yeah. Well, if I thought it was going to be that bad, you wouldn't find me this side of Singapore, in either direction. The way we've got it rigged, it'll be safe as churchmice in the Vatican."

"Just the same, Mick, say your prayers."

"And a couple of fingers on the panic button," Mick said. "Don't fret yourself. I've been on jobs like this before."

He signed off. He didn't like to think how some of those jobs had gone.

Nine days later, toward evening, the wind started to blow. By nightfall, big wet gobs of snow were slanting thickly down. Mick went to sleep with the wind's howl rattling his windows. Cold

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air leaked through every crack in the walls.

He'd started out in the east Texas oilfields, and even after his well fire and blowout business was taking him all over the world, he'd kept his base there until the vacuum business got started. Then, since he couldn't move the bunghole to Texas, he transplanted to Boulder, which any right-thinking man from east Texas was inclined to think of as the extreme and frequently frozen north. Every time he started to forget that, Charli had reminded him. When he woke in the morning and looked out, he saw the proof of it with a nice icy glaze on top of it all. When he found out the lights weren't working and the phone was dead, he decided maybe it was time the hired brains stopped dithering.

After Charli moved out, he'd taken up quarters in a stone cottage across the road and down a little from the Nothing factory. This morning, walking that distance was like walking on a floor full of marbles. He borrowed a four-wheel-drive from the parking lot and tooled down into town, one eye on the slickery road and the other watching the power lines.

Soon enough he saw what had happened to the lights and the phone. One place a light pole lay angled half across the road in a scatter of shattered ice, a tangle of wires around its head. Another place, a pole-top transformer lay broken on the shoulder, and the sprawl of wires around it gave it a look of something dead with numerous legs and arms like supple snakes. Farther off, where a high-voltage line marched down a hillside, two of the high steel towers lay crumpled, thick crusts of ice beginning to melt from their struts under the blaze of the newly risen sun. If it was like that down here, Mick thought, he wondered what it was like up in the mountains.

The power and light company's service yard was near the edge of town, which was just as well. Mick wasn't eager to navigate where there were a lot of side streets and corners, not to mention other traffic. Not that anybody with sense was out driving this morning.

He made the turn into the yard as slow and careful as he could. Even so, the jeep's back end swung dangerously wide before the wheels took hold again. Getting old, Mick decided.

Frank Skelton was fortyish, gaunt of face, slack-eyed. He looked the worse for a bad night and an unscheduled early morning. Mick got though to him by the simple process of not letting anybody slow him down.

"Heard you got troubles," Mick said.

"You could say that." Skelton slouched down in his chair and pawed raw eyes. A radio speaker on a sideboard behind the scarred desk barked communications between a dispatcher and a seemingly infinite number of work crews. A lot of it was jargon. By contrast, the phone on the desk was as quiet as a fossilized clam. On the wall a large white panel displayed a schematic of the local system. It had places for indicator lights; most of them were dark.

"Looks like your pipe's sprung a leak," Mick said.

"If that's all you came to say . . ." Skelton began. Mick didn't let him get any further.

"Bones, you know me better than

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that," he said. "Thought I could maybe lend a hand."

"How many fingers you expect to come out ahead?"

Mick waved that one away. "There's a thing I been working on, might give us something you need. Let's have it straight. How long's the juice going to be off?"

Skelton swung around to gaze up at the system chart. "Most of the local lines we could have back in service in a couple of days. The problem is—" He waved a hand. "We've got one good line bringing a bit down from Nederland. About enough to toast three slices of bread at a time. Every other line . . ." His hand chopped down. "Seven towers down for sure, and two more likely to crash. You got any idea how long it takes to replace a tower?"

"You're in the business," Mick said. "I'm not."

"Well, first you got to order the aluminum," Skelton said. "We could replace maybe two or three from stock in the yard, but seven . . ." He broke off as a new voice came through on the radio. He sighed. "Make that nine. Who'd of thought a bit of ice and a little wind . . ."

"Build for the usual, and the first time something else comes along . . ." Mick said. "What about the lines out to my place?"

"What difference does it make? If we don't have any coming in, we can't put any out."

Mick shrugged elaborately. "Well, I was just thinking, it's possible I'll be having a little to spare. Interested?"

"It's not something to kid around about, Mick."

"Who's kidding? You want it or don't you?"

"Sure I want it. But . . ."

"The lines're down in a couple of places. You put a crew to patching it and leave the rest to me."

"Mick, we've got a city of a hundred thousand here. I don't know what you've got, but it doesn't make any difference. It can't turn out that kind of power."

Mick gave him another shrug. "Maybe not. Have to admit I don't know how much it'll turn out, myself. May not work at all. Time we cranked it up and see if it flies."

Bones threw a glance at the window. Dripping icicles blocked the view like the bars of a badly built cage.

"Lord knows, we could use the juice." He rubbed his jaw. "What's your price?"

Mick shook his head. "Just fix the lines. Fix 'em to carry all the juice you can handle. If it works, I'll take my pay in newspaper stories. If it doesn't, I'll owe you. Fair enough?"

It worked.

It got into the Denver papers, and from there the wire services grabbed it and ran. Even *The Wall Street Journal* pricked up its ears.

"Trouble with you, Chug," he said when Chug phoned, as he'd known Chug would, "you only bet on what you know. And there's sure a lot you don't know."

"You deliberately withheld information," Chug said. "Deliberately you . . ."

"You saw what my dingus could do and you liked what you saw," Mick

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said. "I told you I had some other spokes in my wheel I was planning to deal, and you knew one of 'em was a way to crank out electric juice. So all of a sudden what's your objection?"

For a while, all that came out of the phone was noises like a motor being started with more cylinders missing than hitting. "It's . . . it's . . . it's . . ." Chug spluttered. "That juice was natural! This . . . this, what you've got, it doesn't cost you anything. It'll change the whole energy pricing structure! It . . ."

"How's that different from the deal you got?" Mick asked. "All you got to do for oil is twist the faucet and out it squirts."

"What about your, uh . . . what do you call it? Retainer fee? That wasn't peanuts."

"My bankers don't eat peanuts," Mick said. "If this thing hadn't worked, they'd of ate me. What you're mad about, Chug, you're mad seeing somebody else with a sweet deal, and you not getting a slice of it."

"You bought it with my money," Chug accused.

"Money you paid me for something. You and some other people. You thought it was worth the price. Why should I argue?"

"And then you pulled a tricky and it's worth a dime on the dollar."

"Dollar you paid? Or dollar you thought you'd rake in?" Mick asked. "Look. Before you melt the insulators off all the poles from here to there, why don't you come out here and we'll have us a dinner and we'll talk. We've got a steak house here that they walk the cows through the back door and people through the front. Inside, the two of 'em get put together. If you're quick enough, it won't of even stopped breathing."

Long silence.

"Who's buying?" Chug asked.

"I am," Mick said. "You bought last time."

"There's more coming," Mick told the waiter, and ordered a Jameson's. Chug blinked and looked left behind while he ordered a Cutty Sark. There was a piano inside of earshot, but not so close as to disable the brain.

"More?" Chug asked. "You didn't . . ."

Mick pretended he didn't hear. "You know?" he said. "They've still got that boat."

Chug was still trying to find his place in the script. "Boat?"

"The Cutty Sark," Mick explained. "The one that's got its picture on the bottle. Trust a Scotchman to find uses for something that's useless. First it was haggis. Now they've got this boat pulled up on the banks of the Clyde right close to downtown Edinburgh, and every time they get a heavy rain they pump out the bilges and . . ."

"I've quit believing anything you tell me," Chug said. "If I believed it before, if you tried to tell it to me, I'd stop."

He'd met Chug's plane at Stapleton International and taken him straight to the Nothing factory to show him the new toy. Like most new things, it hadn't looked like much: a long-necked hourglass made of boilerplate lying on its side, each of its globes twice as tall as a man. It made almost no sound; only

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the sizzle of leaking electricity where the cables came out.

There were viewports. Chug had to go up on tiptoe to see in. Mick leaned down. "Careful what you touch," he said. "We didn't have time enough to paint everything red."

Chug backed off a little. "All right. Tell me about it."

"This is the hot end," Mick said with a nod at the viewport. "We've set up one congruency between a spot about a hundred miles under the surface of the sun and a place somewhere between the orbits of Earth and Venus. Doesn't matter exactly where; in fact, it wobbles around a bit. Then we've got another right next to that spot, and that one's other end is a place on the other side of the Moon where there's a genuine zero gravity situation. That one's tricky; it stays on the other side of the Moon while the Moon goes around us, because that's what happens to the zero gravity point. Don't ask me why; I don't know either. Anyway, between there and . . ." He tapped a blunt fingernail on the viewport glass. ". . . that's another linkup. It's sort of roundabout, but the hired brains say it's the only way they can think to make the connection when the places you want to connect are in different gravity dominance zones. Besides which, between you and me, I wouldn't care to have that stuff squirting out straight from the sun. It needs some stepping down and a few safety valves. Let it loose and we'd roast in our own juice."

Chug went up on tiptoe again. He squinted. "Looks hot enough."

"It's warm," Mick allowed. "And even with the loose connections and more of it leaking off than comes through, it's still got a fair head of pressure behind it. Those Frankenstein laboratory things you see sort of wrapped around it are magnets that keep it from spreading out in all directions and eating its way out of the containment. Which it's plenty hot enough to do. And the funnel—you see how the magnet bottle's feeding a jet of it straight down its middle like a hose? Well, you can't see it, but inside it's got what they call a magnetohydrodynamic generator, which is about the longest word I know and I'm still not sure exactly what it means or how it does what it does. All I know, it turns that squirt of hot stuff into something that'll make your electric toothbrush buzz without getting its fingers frittered. And then down there beyond the magneto-whatever-the-rest-of-it-was, there's another congruency that dumps what's left back out into space somewhere. Use once and throw away. Lots more where it came from."

Chug walked around the machine a couple of times, scuffing his feet on the bare concrete floor and probably wishing it had some tires he could kick. He peered into the viewports as if he wondered what time the girls came on. He stood for a long time in front of an instrument readout panel. How much of the numbers and signal lights meant anything to him, Mick decided not to ask. Finally he walked back to where Mick waited.

"That thing lit up a whole city?"

"Lights, televisions, pinball machines, and truffle cutters," Mick said. "Still is. My price is cheaper than the people they were getting it from, and besides I don't know how to shut it off."

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"You made it with my money," Chug said.

"Yours and a lot of other people's," Mick said. "Your cash and me knowing which slot to drop it in. Far as that goes, how much of that consortium was yours and how much the people you scratched together?"

"Never mind," Chug said. "Not your business."

Now, looking up from his menu, he saw the headwaiter plowing his way through the tables like a schooner through whitecaps. Three well-tailored, neat-barbered men trailed in his wake. "Here they come now," Mick said.

He got up and stuck out his hand. "Glad you could make it."

Arthur Bascomb looked at the hand for a long moment before accepting it. "I believe we have some matters to discuss," he said in a fiercely controlled voice.

Mick shook hands with Spencer Fiske. "How was the flight?"

"It was not enjoyable," Fiske said. "You should know our lawyers are already looking into this affair. Of course, we'll be interested to know what you have to say."

"And Ambrose . . ." Mick went on, getting his hand free from Fiske so he could offer it again. "How do you like this weather?"

Ambrose Delbanco smiled a thin smile, all show and no substance. "When I wish to see snow, Mr. Candido, I look east from my sun deck. I see it on the mountains, always, at the higher elevations."

The headwaiter made a show of distributing menus, virtually forcing all to find places at the table. The other waiter arrived with the Jameson's and the Cutty Sark. "If it gurgles," Mick said, "they've got it. What's your?"

Moments later the waiter strode off with instructions to secure one gin and tonic, one Jim Beam, and one ginger ale. Mick swung his glance around the table. Ambrose Delbanco was the one he came to last.

"You're the one that wants the Zambesi poured out in the middle of Nevada. You've been buying desert like you expect to corner the market for sand. We're ready to deliver any time you're ready at your end. What's your complaint?"

"My complaint?" Delbanco sat stiffly erect and flicked a thumb over his perfectly trimmed mustache. "I was led to believe the water for my irrigated farms could also be employed to generate power, not only for the operation of my farms but also, if there was an excess, to be sold to other users. Now you have done a thing that shall radically make smaller the costs of power production. It sends into question the entire financial structure of my plans."

Mick cocked a brow to Fiske. "You knew he was planning that?"

"We had come to an arrangement," Fiske said, only slightly embarrassed. "There would have been advantages to both of us. Now, however . . ."

Mick switched to Arthur Bascomb. "And what's yours?"

Bascomb knocked a knuckle against the table's edge. "I have several. To begin with, analysis of samples from my office reveals that the iron will contain a number of impurities when it arrives at our mill. Impurities which must be

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removed. Our chemists are working on the problem, but whatever they eventually come up with will undoubtedly be expensive and will require considerable investment in new equipment. Meanwhile, you have developed a process for producing electrical power that will bring down the cost of such energy to almost nonexistent. This would have the result that aluminum, for which electricity is a large part of the production costs, would become competitive with our products for many uses. And that, of course, would upset the entire calculation on which we based our decision to buy the services you so persuasively offered."

The last phrase came off his tongue with exactly the right bitter inflection.

"What you're saying," Mick told him, leaning back, fist around his Jameson's, "you're thinking the deal doesn't look as fat as the first time you looked at it."

"I think," Spencer Fiske said, "you could quote all of us on that."

The waiter came back with the rest of the drinks, plunked them down with exactness—especially the ginger ale—and after a moment's pause would have gone away if Mick hadn't gestured with his copy of the menu. So the waiter stayed to find out how they wanted their beef. "Just cauterize the wound," Mick instructed when it came his turn.

When they were alone again, Mick got the envelopes out of his inside coat pocket. "You're the ones complaining loudest, or anyway soonest. So you get these first."

Chug started to accept the one proffered him, but turned reluctant. "If it's a summons . . ." he warned.

"Summons for what?" Mick wanted to know. "Parking? You didn't even drive."

"Countersuit to the one you think we're getting on you," Chug said. "First bark makes top dog." He pulled his hand back the rest of the way.

Mick took an injured tone. "Chug, in all the years you've known me, was I ever the first to go yelling for a mouthpiece?"

"Usually, you've been happy with how you rigged things," Chug said. "This time you've gone too far."

Rock would have turned to jelly under Mick's gaze. Chug bore up only slightly better. "If you don't want it, just say so. In front of all these witnesses," Mick said.

Cautiously, as if it had teeth, Chug reached to take the envelope. The others each accepted theirs with the same wary fatalism. The envelopes were sealed. Chug had his index finger under the flap of his, starting to pry it up, when Bascomb asked, "May we open these now?"

"Any time you like," Mick said, and put down his Jameson's. What was left of it. "But there's some things I should tell you before you get too far, or maybe it won't make much sense."

Chug stopped his struggle with the envelope flap. The others hadn't started. They put them down on the table, each one with the fork on one side and the spoons on the other. Mick got out his pipe and fixin's.

"I found out I had a gadget," he said. "And I saw some of the things I could do with it, and some other things maybe I could do. Only maybe I couldn't, and it was going to take a lot of cash to find

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out; same price if it works or doesn't. What it came down to, if I wanted to go for it, I had to raise the cash."

He packed a scoop of tobacco into his pipe. "Two or three ways I could do it. I could go to the bank with a tin cup—"

"Or a gun," Chug said. "More your style."

Mick ignored that. "I could whack up a corporation and sell shares, or—" He made busy lighting his pipe— "or I could sell something. Now . . ." He waved the match until it went out, broke it double, then dropped it in the nearest ashtray. He pulled deep on his pipe. "Now bankers, they're a funny lot. They don't like taking chances, and I'll admit the idea I was cooking might of sounded a trifle peculiar to unsophisticated ears." He snorted. "If it hadn't been my idea to start with, it would of sounded funny to *me*. The same goes for making a corporation out of it." He pointed his pipestem at them, one after another. "Think about it real hard. You know what my idea was, and you know how it works. But if I'd gone to you when it was only a lightbulb sticking out of my head and I couldn't even show you something to give the impression it had a chance of working, and I said I was selling shares that'd get you inside on the ground floor, how long would you of let me talk before you throw me out? Or call the cops? Or the padded-cell squad?"

None of them had a quick answer. They looked at each other and, embarrassed by the mutual silence, looked elsewhere.

"That left me with selling something. And there wasn't much I had lying around worth selling. Not for that kind of cash. My old lady took all the heirlooms when she moved out."

"Mr. Candido," Spencer Fiske said. "I think you have lost sight of one fact. We are not interested in what you wanted to do. We are concerned with what you have done to us in the process."

Mick took the pipe out of his mouth. "Might be you've got a point there," he admitted calmly. "But don't be too sure till you read your contract again. And had a look at your Christmas present." He tilted his head just right to indicate the envelope, still unopened, in front of Fiske. "A few weeks late, maybe, but . . ."

That got them started again tearing open the envelopes. Mick went on talking. "Somewhere in all your contracts, and all the others' too, there's something about . . ." He half shut his eyes and looked ceilingwards. ". . . 'at sole discretion of the seller—' That's me. '—share participation in such applications of the process as the seller or his agents may develop and reserve, excluding such applications as seller may have, or in future may license either exclusively or non-exclusively to other parties—' And so forth and so forth all the way from here to there. Maybe your lawyers did some headscratching about it, but they'd of figured it was maybe giving you something a little extra instead of taking it away, so . . ."

By then Chug had his out of the envelope and unfolded. He was holding it up in the light, scowling, moving his lips as he puzzled out what he was looking at. Abruptly he stopped, froze as if he'd felt a needle stuck into his body, low down, and started moving his

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mouth as if he was talking but no words coming out.

"We can't call this a stockholders' meeting," Mick went on, "on account of some of 'em haven't even found out they're stockholders yet."

"There's a trick in it," Chug said. "There's got to be."

There wasn't, but making him believe it was hard. Maybe, in the end, he was convinced; maybe not.

"You've done one stunt," he said. "Why not another?"

"Study on it," Mick told him.

That didn't end the talk, though. They talked about it over steaks red, steaks brown, and steaks charred, with onions and marinated mushroom buttons and strips of bacon and Worcestershire sauce. Chug was still grumbling, but the others were as full of questions as children new at school.

"Uncle had to lend a hand," Mick said. "Without uncle, it couldn't get done. He wanted it just as much as me, but he made me to understand he had a price. He didn't want somebody yelling swindle. Not with him helping out, he didn't. So me, I had to make sure you'd be happy. You happy?"

Chug just glared.

And again, with a second Jameson's in his fist, or maybe it was his third, "Us in this country, we built the way we live out of cheap energy. Then the price of it started going up, and there wasn't as much to be had. We had to reach out farther and farther to get it. Or maybe that's saying the same thing three different ways. Only now, well, now we can reach far enough to pull in all we want. All we'll ever need."

"Don't be too sure of that," Spencer Fiske said. "Aside from the fact that the cost of energy determines how it is used—and I assure you it *is* a fact—there will be people convinced that, by removing that material from the sun, you will cause it to lose strength. I do not say it is true, but there will be people who believe it, and who will do their utmost to make you stop."

Mick rubbed a knuckle along his jaw. "All right, let 'em. How far's Alpha Centaurus?" He knocked his pipe on the side of the table. "How far's the nearest quasar?" He dumped the handful of dottle on his plate, in the middle of his steak's remnants, and started stoking up again.

"Pardon me," Arthur Bascomb said. "What is a quasar?"

Mick looked at him. "Last I heard, nobody was really sure. Maybe we'll find out."

And again, with his pipe full and warm, "Something else the hired brains are working on. They think they can move the other end of the hole. Maybe even both ends. That'll make a lot of things possible. For one, then maybe we can close up a hole when we don't want it any more, which would simplify a lot of things. Or maybe we can put it aboard something that moves and power the thing with the energy that comes out —don't look so nervous, Chug. It'd have to be something big enough to have a computer aboard and two or three other gadgets. With something like that in your belly, you don't want to be making any sudden moves. But, now, an oil tanker, say, only we don't need those any more, but a merchant ship, or a . . . a . . . how about spacecraft?

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Is there any reason why we can't? Or shouldn't?"

They watched him talk. They listened. Like primitive men around the first fire. It was all new to them. There seemed to be no limits. Maybe there weren't any.

And finally, when Spencer Fiske had said, "But if you were going to give it all away, why did you . . . ?"

Mick said: "Who said all? A good chunk of it's staying right here." He slapped his pocket. "Mine to do what I like with."

Bascomb raised a questioning eyebrow. "May we inquire . . . ?"

"Half," Mick said. "Not that it's going to pay much in dividends for a while. Long way to go before it starts to pay off. And at my age . . ."

"Then you haven't answered my question," Fiske said.

"Haven't you ever done something because it was worth doing, never mind if it put jingle in your jeans or didn't?" He looked around the table, saw only puzzlement.

"I'm afraid I don't understand," Bascomb said. "You're a sensible man. A very practical man, I'd say. What other reason could you possibly have?" He thought a moment. "Of course, you foresee an eventual profit. Yes, indeed. But I take it you would say that wasn't why you . . . ?"

Mick laid his pipe aside. "Look," he said. "You're forgetting something yourself. Money's just a way of keeping score. It's a tricky game and there's a lot of moves, but that's all it is. It's not the game."

"Game?" Fiske wondered. "What are you talking about?"

They didn't understand, these men. They'd never understand. Even Chug wouldn't. Nor would he, in their eyes, seem manly if they did.

"Not your business," Mick snapped in a tone that came down like an iron door.

She could have phoned any time. The time she chose was late evening, awkward. He'd been reading business papers until his eyes felt like french-fried potatoes and his brain was cheese. He picked up the phone with his pants in the other hand.

"Mick?"

For a moment he didn't know her voice. "Charli?"

"I'm calling to thank you for the Christmas present."

That had been six, seven weeks ago. She hadn't thought it was worth anything back then. Terry hadn't known it was worth anything either, but she'd thanked him for hers right away. It would serve no good, though, to speak that thought now.

"But it doesn't change anything," Charli said into his silence. "It's something out of one of your deals."

He couldn't deny it; he didn't see there was anything wrong with it, either. "If you like the egg, kiss the chicken."

As soon as it was off his tongue, he knew he shouldn't have said it.

"Sometimes, Mick, I don't understand you," she said.

She didn't want to understand him. "Look," he said. "I'm not trying to shuffle you out of anything. I've got it arranged: you get your check the first of the month, every month, and that's going to keep right on. Any dividends

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from ResourceCorp—and sooner or later there'll be plenty—that's extra."

"I'm not sure I want to have anything from something like that," she said.

"So sell out. Those shares've got a good price this week. It'll probably go down now before it goes up. But think hard and sharp what you put that money into. The world's going to change a lot, and right now you've got a piece of it by the tail. Because I wanted you to have it. Even if it did come out of one of my deals."

"It doesn't change anything, Mick."

"I didn't think it would," Mick said. "I did it anyway."

"I don't understand you, Mick."

Mick sighed. "No, I don't suppose you do. I don't suppose you ever did." Already it was a different world from the one he was born in. You got older, and maybe you got smarter. With some luck, maybe you could make a corner of it better for people you cared about. Easier to live in. Without luck, you just got older. Mostly what you got was something in between. ■

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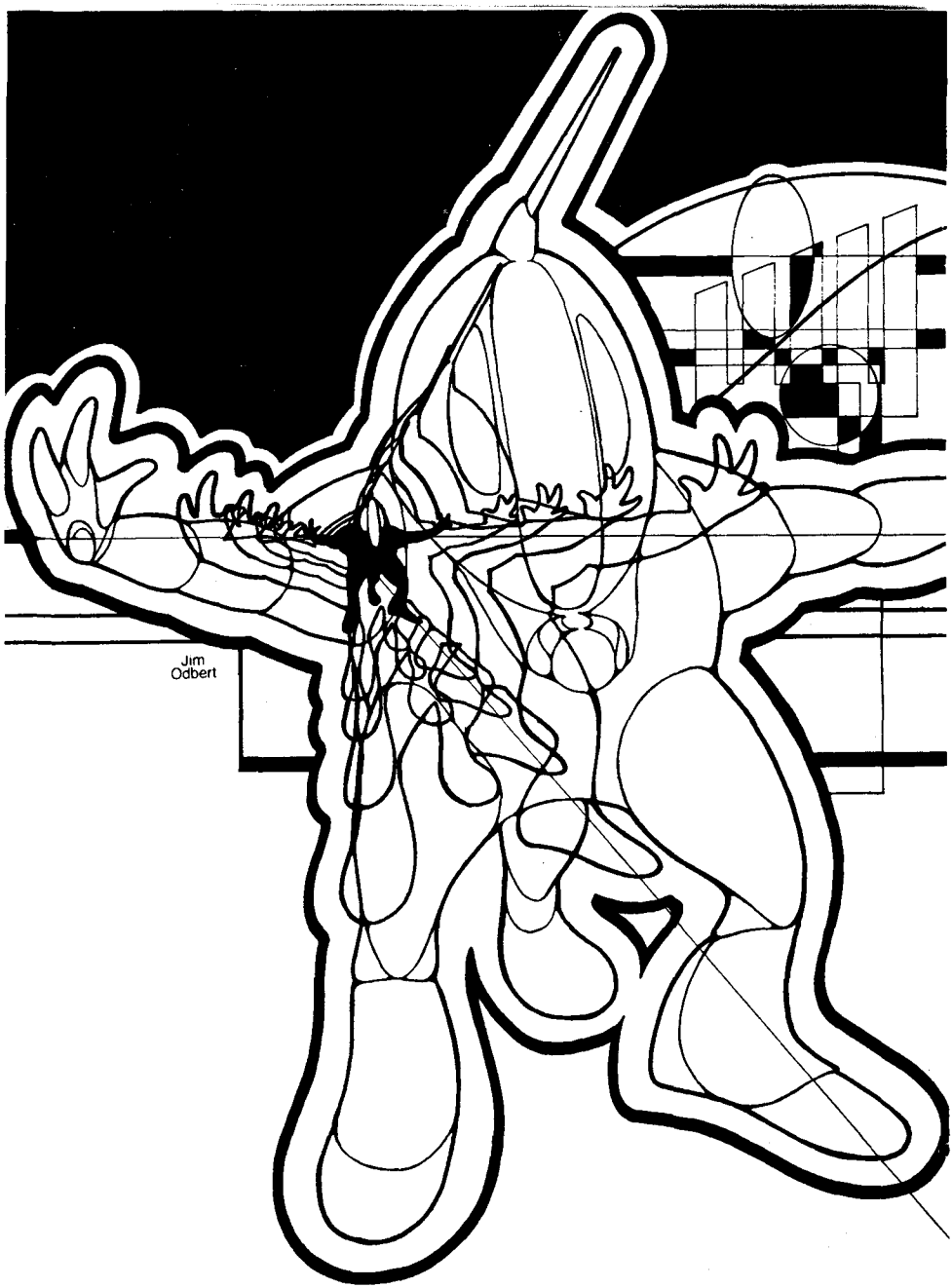

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Bill Pronzini
and
Barry N. Malzberg

VANISHING POINT

Those Luna Immigration officers are back—this time with a problem involving a murder and, later, a locked room....

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We arrested the Melnusian as soon as he stepped off the hydrocarbon tanker at Checkpoint unloading. I was part of the official detail; in fact, I was the first to take hold of his hard-muscled arm and to slip the shackles over his wrists. He didn't put up much of a struggle. In the heavy life-support suit the Melnusians have to wear in oxygenated surroundings like the Luna dome, he was more or less helpless anyway.

The ease of the capture probably should have alerted me to the difficulties which followed. At Luna Immigration, with hundreds of races, thousands of divergent species of intelligent life streaming through the great clearing decks every day, nothing is quite as it seems; a career as a Customs Inspector will, if nothing else, prepare one for the understanding that little is as it seems, and that life on the myriad worlds is not to be fathomed easily, if at all.

But it *seemed* easy at the time. The Melnusian seemed to welcome the shackles, as if they were what he deserved; as if the burden of having murdered a fellow engineer on his mining detail had been so overwhelming in retrospect that, after his hasty and hopeless flight, he was relieved to be caught. So I thought that it was over and done with, when it was simply beginning.

Melnusians are modular tripeds (the third appendage is vestigial and useless), a private and inarticulate race so temperamentally and intellectually suited for asteroid mining that they appear to have been bred for it—which, in the grander, cosmic scheme of things, they may well have been. The Belt is rich in a wide range of minerals and bituminous hydrocarbons, everything except fossil fuels such as natural gas. The presence of these hydrocarbons was not discovered until 2178, but since that discovery the mining of them has evolved into one of the principal industries of this solar system. The original miners were from Earth, but when the Melnusians joined the Federation a century ago and were bound into the economic union they quickly took over essential control; whatever goes on inside a Melnusian's head does not appear to conflict with the necessity of spending daily shifts of twelve Earth hours in the drilling of shafts, the building of pipelines and storage tanks, the servicing of the huge tankers that shuttle between the Belt and several populated worlds, one of them being Earth.

And they do all of this with no one for company except themselves and a subservient race of creatures from a small planet similar to their own in the Pleiades Cluster. These subservient beings, the Rhyx, are nitrogenous bipeds quite a bit smaller in stature and intellect than the Melnusians. Although their official acceptance into the Federation predates that of the Melnusians by twenty-three years, they had virtually no function in the Federation itself until the opening of the Belt to hydrocarbon mining; there is some question as to whether the Rhyx are indeed intelligent beings, their degree of sentience having been judged so marginal that they were admitted only on a provisional basis after their planet was swept in 2086. The first of them were imported by the Melnusians, as menials and trundlers, and their relationship appears to be symbiotic.

All of these facts were in the *Check-*

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list of Creatures, the manual by which those of us at Luna Immigration live and which I read immediately on receiving the alert from Mining Base 56.

The alert said that a crazed Melnusian had attacked and killed another engineer in a fit of apparent jealous rage, in quarters during off-shift. He had then donned his life-support suit and Official Traveler's insignia, and boarded an Earth-bound tanker just before it was scheduled for lift-off. This rather pitiful attempt at escape did him no good at all. The dead engineer was found shortly after the tanker departed, and the alert was sent to us several hours before the ship's ETA. Its captain was also notified, but no attempt to place the criminal under arrest was made by the crew; they were not professionals in the securing of dangerous beings, and the Luna brain-trust did not want to jeopardize any more lives. The Melnusian was placed under constant shipboard surveillance, however, to ensure that he didn't try to attack anyone else or commit any other illegal act en route. And when the tanker arrived at Checkpoint, we had made the arrest and within minutes had the suspect secured in one of the Detention and Interrogation cubicles.

That should have been the end of it.

But, as I said, it wasn't.

Less than an hour after he had been locked into the detention cell—a room eighteen feet by sixteen, walled and ceilinged in an impregnable alloy, with only a single hermetically sealed exit attended by three guards—the prisoner disappeared.

"It's impossible," the Supervisor said to me in his office a short while later. He considers me his resident genius, and when anything of a mysterious nature happens, I'm usually the first one he turns to. "Nobody should be able to get out of that cell. So how did he do it? And where is he?"

"I don't know," I said.

"Don't you have *any* idea?"

"Not yet. I checked the cell carefully, but there's not a clue. Nothing in it except the usual furnishings and the Melnusian's life-support suit, standing against one wall. No marks anywhere. Nothing wrong with the equipment that seals the door. And none of the guards claims to have heard anything. They didn't realize he was gone until one of them happened to notice that there hadn't been any movement in some time, went in to check, and looked through the suit's faceplate."

"How come the suit is standing? Why isn't it all crumpled on the floor, with him not in it?"

"It's one of those new elasticized suits, form-retaining and built to withstand high pressure and other hazards. They can be put on or taken off in a matter of seconds, too. The advancements in modern spatial technology—"

"Never mind about modern spatial technology," the Supervisor said. His major weakness is that he's an administrator through and through; he has neither patience nor imagination. "Tell me this: can he live very long without the suit?"

"Fifteen minutes or so," I said. "Melnusians can breathe oxygenated atmosphere about that long before suffocating."

"What about the supply shed where

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we keep the various emergency life-support suits?"

"Nothing's missing from there," I said. "I checked as soon as I left Detention. And the shed is under full surveillance now."

He drummed his knuckles on the desk—a frustrated staccato sound.

I said, "I did a full *Checklist* scan on the Melnusians. I thought maybe they had some sort of power that might explain the disappearance. You know—shape-changing, like that Lyran bomb incident we had a while back. Or teleportation, telekinesis, anything like that."

"And?"

"Nothing," I said. "They don't have any powers. They're a pretty uninteresting race, in fact. And biologically weak; their life span is only forty-seven of our years and they start to wither early. They handle their end of the mining work by machine, not by hand. In the old days of manual labor and unsophisticated machinery, they'd have starved to death. But they're brilliant when it comes to efficient, modern hydrocarbon mining."

"Fine, wonderful. Then how did this one get out of the cell? Some sort of machinery gimmick?"

"Possibly. He can't have escaped from the dome, at least. That's the main thing."

"He'd better not get out," the Supervisor said ominously. "Do you know what a black eye that would be for Luna Immigration? For me?"

"It won't come to that. We won't have to admit that the Melnusian disappeared."

He glared at me. "What does that mean? Are you suggesting falsification?"

"No," I said. "I'm suggesting we find him."

"How? Where?"

"Wherever he is," I said.

The detention cubicle had been resealed, of course, so that nothing could be disturbed inside. I spoke to the chief of guards, and he released the door lock and let the Super and me inside. Then he followed us in, nervously. His head was on the block, too, if we didn't find out what had happened to the prisoner.

I prowled around again, looking at the functional gray-metal furnishings—table, chair, wall bunk. The Melnusian's life-support suit, as I had told the Supervisor, was standing against one wall. Not only did it retain its shape, but it seemed even bulkier empty than it had with the Melnusian inside it. I examined it again, peered through the small narrow faceplate at the emptiness within; it still told me nothing. Then I re-examined the floor, the walls, the inside of the door.

The Supervisor said, "Well?"

I shook my head.

"It looks bad, sir," the guard chief said.

The Super gave him a baleful look. "Of course it looks bad. We've lost a murderer, haven't we?"

"From a locked and sealed cell whose only exit was under constant surveillance. It's impossible, sir. It's just . . . impossible."

"Wonderful," the Supervisor said sourly. "A member of the Melnusian Mission, and a detachment of Melnusian police, are on their way from Earth;

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they'll be landing in two hours. They'll no doubt be delighted to hear you say it's impossible for their prisoner to have vanished, even though he has."

The chief made an apologetic noise and kept quiet.

The Supervisor eyed me again. "Have *you* got anything else to say?"

"Not right now," I told him. "I need some more time to think."

"How much time?"

"Until something occurs to me."

"Well, something had better occur to you within two hours. That's all the time we've got."

I went back to my inspection post, Table Three, and reclaimed the shift. Working helps me think, because the work itself, for the most part, is routine and of a mechanical nature. I passed through a steady stream of Earth-bound individuals. Many of them were humans, on their way home from trips or on personal or governmental business, but as always there were dozens of disparate aliens. Among these were a pair of Melnusian engineers from Mining Base 211; one, whose vitae sheet gave his age as forty-four, was going to Earth for medical treatment. He was evidently some sort of important official, or they wouldn't be making an interplanetary effort to keep him alive. As it was he was so enfeebled that I had to help his companion half-carry him into the clearing area to await the next Earth shuttle.

When I finished a limp handclasp ritual with the companion—a solemn Melnusian way of expressing gratitude, according to the *Checklist*—I returned to my post. And passed through a Titanian resettled on Sigma Draconis and carrying a Rigelian falcon, a tall red Lyran in nostalgic battle dress, and a Beta Hydran methane-roller and his thirty-seven children. The whole time my mind kept working, turning this way and that, round and about.

And suddenly I began to see the answer.

I put up the sign that said CLOSED in Federation English, disconcerting an Aldebaranian harmonium player who was about to set up his tripod and perform for me, and went to the inspectors' office. I called Detention and Interrogation to see if anything had happened in the past hour and a half; nothing had. Then I spent ten more minutes with the *Checklist of Creatures*. And finally I hurried down the corridor and into the Supervisor's office.

He glanced up expectantly when I entered; then he looked at his timepiece. "They'll be here in twenty minutes," he said. "Have you come up with anything yet?"

"I think so, sir."

"You have?" he said, brightening. "You know how the prisoner escaped?"

"Let's say I know what happened."

"Well? *What?*"

"I'll tell you after we go back to the cell."

"Why can't you tell me here?"

"I've got a little demonstration in mind."

He glared at me, eagerness and annoyance chasing each other across his lined features. "You have an enlarged taste for drama, you know that?"

"It's one of the few prerogatives of the business," I said mildly.

When we got to Detention and Interrogation I asked the chief of guards and

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two of his men to accompany us. At the cell, after the lock was released, the five of us stepped inside. Everything was just as it had been before, the life-support suit still standing against one wall.

I gestured to the guards. "Take hold of the suit," I said.

Two of them did as I requested.

"Now hang onto it, and make sure you don't let go. It could be dangerous."

The Supervisor gaped at me. "The *suit* could be dangerous?"

"No," I said. "What's inside. *It's not empty.*"

"What? Of course it's empty. Look at it—"

"You'd better look at it yourself, sir."

It was moving.

One of the legs flexed, then other parts of it did the same in an agitated fashion. The guards were so surprised they almost let go of it. The eerie jerking of the suit grew more pronounced, until it seemed to be doing a puppetlike dance. It also bulged, as if it were about to burst from an internal pressure.

"I thought he'd react sooner or later," I said, "and it didn't take as long as I expected. We've seen enough. We'd better get out of here before he agitates himself into an explosion."

I gestured to the guards again and they released the suit, shoved it onto the bunk. When we were all outside the cubicle, the chief resealed the door. Through the viewplate I saw the suit twitch and jerk, continuing its macabre dance horizontally. It still bulged to a dangerous degree.

Behind me the Supervisor said, "What the hell is *in* there?"

"The prisoner," I said.

"What?"

"He never disappeared at all," I said, "at least not in the way we thought. He never went anywhere. He's been inside that suit all along."

"It was impossible—that's the key," I said a few minutes later, as we were on our way to meet the Melnusian delegation from Earth. "A nineteenth-century literary detective, quite famous for generations and still remembered by specialists—his name was Sherlock Holmes—had a motto: When the impossible has been eliminated, then whatever is left, no matter how improbable, must be the answer. Well, our detention cells are built to hold every kind of creature known to the Federation; they may not be escape-proof, but they're the next thing to it. And if the prisoner *had* managed to escape, why hadn't he raided the supply shed or tried to steal another life-support suit from somebody passing through? He couldn't live more than a few minutes without his suit, and yet he'd supposedly left it behind in the cell. Combined, those facts made his escape an impossibility. So I eliminated it. Which left me with the improbable: the prisoner was still in the cell. And that meant the only place he could logically be was inside the suit."

"What did he do?" the Supervisor asked. "Shrink himself somehow?"

"No. We were on the right track when we talked about him *disappearing*. That's just what he did. He disappeared."

"Inside the suit? How could he do that? You told me the Melnusians don't have any special powers."

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"They don't. The prisoner isn't a Melnusian."

The Super's eyes widened. "He isn't? Then what is he?"

"He's a Rhyx," I said. "Disguised as a Melnusian—disguised by the suit. The *Checklist* says that Rhyx are of dubious intelligence, but this one, at least, has a certain amount of cunning. After he committed his homicide he decided to take the Earth-bound tanker instead of remaining on Mining Base 56 and pretending innocence. He managed to steal another Melnusian's life-support suit and Traveler's insignia, those of an engineer away somewhere where he couldn't be easily traced. The Rhyx, through some quirk of nature, possess the genetic equipment to breathe a similar atmosphere mix to the Melnusians'; the suit of one will keep a member of the other race alive, which may have something to do with their symbiotic relationship. The Rhyx are smaller in stature, and bipedal, but the *Checklist* says the third Melnusian leg is vestigial and useless. With some artful padding, our Rhyx filled out the suit so that the difference wasn't noticed. Also, the faceplates on those suits are narrow and small; you'd have to get up close and peer inside to see that the wearer wasn't what he seemed to be. Nobody did that on Mining Base 56. Nobody did it on the tanker, either. Everybody believed he was a Melnusian, which was the central part of his plan."

"What plan?"

"To outfox us here at Checkpoint," I said. "The Rhyx knew he couldn't get past us without the proper papers; he knew he'd be arrested. That was just what he *wanted* to happen, as long as we also mistook him for a Melnusian. When we did he went ahead and vanished. He probably figured we would put the suit in the emergency supply shed, with the others, or give it to the Melnusian Mission from Earth. Either way, it suited his purpose . . . no pun intended."

The Supervisor nodded. "Because all the while, he'd be inside it."

"Right. The first chance he had, he'd have made his escape. And we wouldn't know what had really happened until it was too late."

"Ingenious." He gave me a benign, and very relieved, smile. The look in his eyes said my promotion to Chief Inspector was not far off. "Now the major question. How did he do it? Do Rhyx have some sort of disappearing ability?"

"You might say that."

"Invisibility? Shape-changing?"

"Neither one. But then again, in a sense, both of those. A sort of controlled vanishing point."

He sighed. "Well?"

"First let me tell you what led me to the answer," I said, still drawing it out. The Supervisor had been right: I *did* have a taste for the dramatic. "It was two things. When we arrested the prisoner I took hold of his arm; it was rock-hard. But the Melnusians are a weak, flabby race. I helped an old one through Checkpoint this afternoon, and performed a handshake ritual with another. The feel of them, as opposed to the feel of the prisoner, was entirely different."

"Hm. What was the second thing?"

"The suit itself. I thought, when we went into the cell together the first time, that it looked even bulkier standing there

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than it had with the Melnusian inside it. Later on, I realized it didn't just look bulky; it was *bulging* from a pressure that had built up inside it. Now those new elasticized suits are built to withstand high pressure, internal as well as external; in order for it to bulge like that, the internal pressure had to have been close to 1000 atmospheres. One of the old suits would already have exploded. As it was, the Rhyx was taking a large gamble that this new one wouldn't. But he was desperate and he didn't have any other choice." I shrugged. "Anyhow, that bulging told me for sure that the Rhyx was still inside, and gave me the rest of the answer."

"What caused the pressure? And how did you know he's a Rhyx?"

"By reading the *Checklist*. It says the Rhyx are nitrogenous creatures—almost pure nitrogen-based. Their physical makeup is similar to that of the element itself, and it seems they can more or less control their physical state. They prefer the solid form—rock-hard solidity, as it happens—so they can do their mining work. But for periods of rest, or for other purposes, they often revert to their intrinsic state."

"You mean what's inside that suit is nothing more than—"

"Yep," I said. "A natural gas." ■

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The Alternate View:
CITIZENSHIP & SOVEREIGNTY

Jerry Pournelle

Last week I sent out the invitations to the second meeting of the Citizens Advisory Council on National Space Policy. By the time you read this the council meeting will be over, and I'll know a lot more.

One thing I do know: There's a lot more interest in space. Things Are Happening. What were once mere idle speculations by science fictioneers have become vital policy questions.

Item: The National Academy of Sciences has studied Solar Power Satellites. Although the popular press says their report finds SPS impractical, the report itself says they're technically feasible but not economical—which is quite a different proposition altogether, especially since the NAS study looked only at the outmoded NASA "reference system" of silicon cells, and never examined the currently proposed models. SPS isn't dead yet. Given use of extraterrestrial resources, SPS may be the most important concept of the century.

Item: Newt Gingrich and the Space Caucus have introduced a new Fundamental Space Act bill, H.R. 4286. The bill declares that space development, and the spinoff of space industries into the private sector, are fundamental policies of the U.S. It also declares specific goals, such as a permanent U.S. manned presence in space, lunar mines before the end of the century, continuation of the planetary sciences program . . .

Much of the development plan in the bill reads like the report of the first meeting of the Citizens Advisory Council for National Space Policy. It's *not* identical; but it's obvious that the council's influence was fairly strong. That report, incidentally, is available from the L-5 Society at $5.00 postpaid.

Item: H.R. 4286 extends the protection of the U.S. Constitution to citizens in space. Like the Northwest Ordinance, it looks forward to establishment of territorial governments, and even to the admission of space colonies as States of the Union.

Think about that for a while. A few years ago, any congressman who talked about admission of space colonies to the Union would have been taken to Walter Reed for a compulsory mental examination. Now there's a whole bunch of congresspeople who are proud to work for the "Northwest Ordinance of Space."

The bill might even pass.

There's bound to be opposition. Space hasn't won its battles yet. There will be some who see the whole idea as crazy.

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There will also be opposition from those who don't want space colonies to become States of the Union; who don't want Earth sovereignties in space at all. This is not idle chatter any longer. On that, more below.

Item: The Second Meeting of the Citizen's Advisory Council on National Space Policy will consider military space policy (more on that below, too), as well as inter-orbital transportation systems and use of extra-terrestrial resources. The meeting will be attended by high NASA officials, and also by congressional leaders and staff.

I keep getting letters asking how to join the council. Unfortunately, you can't; the council is invitational only, and the invitations are issued by the chair on the advice of influential council members. This isn't an attempt to be snobbish. The council's sessions are *very* hectic, a real pressure cooker. I recall Larry Niven at the first meeting: he'd sat through a long session with the Foreign Policy Committee, and when they were finished they asked him to write up their conclusions. Larry puzzled for a moment, and finally said, "I don't feel inspired . . ." The resulting stares from engineers and scientists who, unlike professional writers, are expected to produce documents *on demand* can only be imagined; and no words can ever describe the look on Larry's face when he realized they didn't care about inspiration, they wanted a draft *now*.

The meetings are not only hectic, they're already overcrowded; so only people who are known to work well together are invited.

Now for the good news: There will be a "mass membership" version of the council, and many council members are likely to attend. The L-5 Society (National Headquarters 1060 E. Elm, Tucson, AZ 85719; $20/year) is sponsoring a convention combining space professionals and space enthusiasts. The convention will be at the Hyatt International Hotel near the Los Angeles Airport, April 4–6, 1982. Professional memberships, which include banquet ticket, meeting procedure summary, some papers, and tickets to a reception for the convention guests of honor, are $70. Regular membership (no banquet or reception tickets; all meeting papers including procedure summary extra) will be $35 in advance, more at the door. Members of the L-5 Society and the American Astronautical Society get in for $10 less. (There is also a limit to the number of convention memberships; you *may* be able to get in at the door, but if you're seriously interested, sign up in advance if you want to be sure. Send checks to the L-5 Society.)

One of the Guests of Honor will be Robert A. Heinlein. Another will be an astronaut. Unfortunately, I'm writing this in August, and two other potential Guests of Honor are unavailable for a week, so I can't announce them. The intention of the committee is to have astronauts and space scientists mix with science fictioneers and other space enthusiasts. NASA and a number of large aerospace companies have promised full cooperation, including movies and displays and photographs. Quite a few space-fanatic science fiction writers have already signed up.

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It should be interesting. Since nothing quite like it has ever been done before, it's impossible to say precisely what will happen. Even the banquet will be different; convention guests will be scattered throughout the room, a "notable" at each table, instead of having all the important people seated uncomfortably facing everyone at one of those ghastly "head tables." The whole idea, banquet and convention alike, is to have space "fans" and space professionals interact.

Of course it's a bit hard to say just who are the fans and who are the pros: is Mr. Heinlein the fan guest of honor? Like me, he hasn't been professionally employed as an engineer for many years. . . .

The convention is intended to be fun, but it has a serious purpose. Thus there won't be any costume party—or hall costumes, for that matter.

Convention programming will be different, too. There will be both professional and "enthusiast" events; one professional panel will try to draft a new Moon Treaty, one that we can support. The draft will be part of the agenda of an upcoming meeting of the Space Council, and go from there to Congress and the White House. Another panel will consider space-suit designs. There'll be a hard look at the Moon vs. asteroids as economical sources of space construction materials. Yet another panel will examine ways that both citizens and space professionals can support the space program—and how we can all contribute to solving such knotty problems as sovereignty in space.

There'll also be lots of informal meetings; once again the idea is to mix up space enthusiasts, science fiction writers, space professionals, and citizens supporting space; the resulting stew has *got* to be interesting and rewarding. I'm looking forward to the parties. My suspicion is that this will be only the first of a series of pro-space conventions—and that this will be the best of them, because it won't yet be as large as the science fiction worldcons.

Anyone wanting to complain about my columns should come tell me. Those who *like* them would be especially welcome. . . .

One of the council agenda items is military space. It's not a popular subject. I recently received a letter that asks, "Have we resigned ourselves to sharing outer space with hydrogen bombs, satellite killers, and manned orbiting laser platforms? Have we lost sight of the original vision of space industrialization?"

Unpleasant questions. Hard questions.

I remember, 'way back in the heady days following World War II, that a group of scientists, most of them members of the old American Rocket Society, signed a ringing declaration: "We will take no frontiers into space."

More recently, the U.S. very nearly signed a treaty stating that heavenly bodies are "the common heritage of mankind," and prohibiting claims of sovereignty over them.

We didn't sign that treaty, largely because of the activities of the L-5 Society. The "common heritage" terminology, which sounds so noble, turns

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out to have a totally chilling effect on investment. What everyone owns can be owned by no one, and will be developed by no one.

But what of sovereignty? Whose laws prevail in space? Who does own extraterrestrial resources, and how can they be exploited without danger to Earth?

What of the criminal law? If one space colonist murders another, who tries the case? Where? What punishments can be exacted? Who pays for law enforcement? Will there be a "rehabilitation" or "penal" program, and who pays for *that?*

These are not idle questions. Let us suppose a lunar settlement—a colony, not a base. Travel to the Moon is very expensive. Return to Earth is not even contemplated; the settlers expect to make their homes on Luna.

The colonists are carefully selected, but they are humans, not angels; and one of them, in jealous rage, does, with full premeditation and malice aforethought, after lying in wait, strike another a blow causing grievous bodily harm; after which the victim does languish, suffer, and die, death occurring before the expiration of a year and a day.

Under the common law, that's murder. But does the common law extend to the Moon? Assume so: who tries the case?

Suppose that everyone on the Moon knows what happened; perhaps all were witness to the crime. How is an impartial jury to be empaneled? Can the case be tried at long distance, before a judge and jury present only by television? Must the prosecution and defense counsels be physically present—and if so, where, in the Earthside courtroom, or on the Moon? Is a jury of Earthlings a jury of peers?

And so forth. As I said, not idle questions. It's about time we addressed this problem of space resources and space sovereignty. H.R. 4286 opens the debate. I expect to see a great deal more about the subject in the *L-5 News*.

The military question is even more vexing, but in some ways it's also simpler: certainly we're going to share space with hydrogen bombs, satellite killers, and manned orbiting laser platforms. The only real question is whose they shall be.

The Soviets already have the satellite killers. They've tested them: non-nuclear zapsats in the past couple of years, nuclear anti-satellite weapons as long ago as 1963. They show no signs of giving up the capability.

They also have orbiting anti-submarine warfare devices powered by 100 kiloWatt nuclear reactors. One of those fell into Canada a couple of years back, but when then-President Carter proposed a ban on reactors in space, the Soviets wouldn't even discuss the matter.

Manned laser battle stations look very attractive. They may even be potentially decisive—and the Soviets are several years ahead of us in their development. They're not about to negotiate them away, and indeed see any proposal to ban them as a U.S. trick to mousetrap them. So what do we do now? Ignore the problem and hope it will go away?

And beyond that: Yes, there are likely to be hydrogen bombs in space. Nuclear explosives may well be required for industrial reasons: to move asteroids, even

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to crack them open. For that matter: why bother with an H-bomb if you've got the capability to move big rocks in orbit?

Shouldn't someone inspect plans for lunar and asteroid mining schemes? But who? And does this mean we're creating an interplanetary bureaucracy before we build the first space industry?

All of which sounds familiar to science-fiction readers, doesn't it? For years and years we've been looking at such questions. But now—well, now they're not science fiction any more. Now they're real questions of national policy, and somebody's got to settle them, and soon, and we don't have any experts. We don't even have any mechanisms for debate.

Which is why the L-5 Society helped create the Citizens Council, and is now sponsoring the first Space Citizens Convention next April.

See you there? ■

● Albert Schweitzer remarks somewhere that we owe kindness even to an insect when we can afford to show it, just because we ought to do something to make up for all the cruelties, necessary as well as unnecessary, which we have inflicted upon almost the whole of animate creation.

Probably not one man in ten is capable of understanding such moral and aesthetic considerations, much less of permitting his conduct to be guided by them. But perhaps twice as many, though still far from a majority, are beginning to realize that the reckless laying waste of the earth has practical consequences. They are at least beginning to hear about "conservation," though they are not even dimly aware of any connection between it and a large morality and are very unlikely to suppose that "conservation" does or could mean anything more than looking after their own welfare.

JOSEPH WOOD KRUTCH

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the reference library

By Tom Easton

And Not Make Dreams Your Master, S. Goldin, Fawcett, $2.25, 222 pp.
Horseclans Odyssey, R. Adams, Signet, $2.75, 241 pp.
Pilgrimage, D. Mendelson, DAW, $2.25, 220 pp.
Twelve Fair Kingdoms, S. H. Elgin, Doubleday, $9.95, 183 pp.
Slow Fall to Dawn, S. Leigh, Bantam, $?, ? pp.
The 1981 Annual World's Best SF, D.A. Wollheim, ed., DAW, $2.50, 252 pp.
The Best Science Fiction of the Year #10, T. Carr, ed., Timescape, $3.50, 434 pp.
Universe 11, T. Carr, ed., Doubleday, $9.95, 192 pp.
New Dimensions 12, M. Randall and R. Silverberg, eds., Timescape, $2.50, 223 pp.
Proteus: Voices for the 80's, R.S. McEnroe, ed., Ace, $2.50, 274 pp.
Sunfall, C.J. Cherryh, DAW, $2.25, 158 pp.
The Possession of Immanuel Wolf and Other Improbable Tales, M. Kaye, Doubleday, $9.95, 171 pp.
On Writing Science Fiction: (The Editors Strike Back), G. H. Scithers, D. Schweitzer, and J.M. Ford, Owlswick Press, $17.50, ? pp.

A few months ago, I reviewed a novel by Stephen Goldin, *A World Called Solitude*. I told you it is a good book and Goldin is an artist. You were entirely justified in taking my comments as an invitation to plunk your money down on any other book with his name on it, certainly on any more recent book. You were justified, yes. I meant my opinion just that way. But you may have felt stung if you grabbed **And Not Make Dreams Your Master** when you saw it.

I know I was disappointed. I picked up the book expecting to read something as good as *Solitude*. What I found was a turgid mixture of long-winded lectures and superhero antics set in a frame designed to let the author get away with anything. The lectures concern the tech-

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nology of Dreaming, a business built on tapping the brainwaves of a few people who can dream vivid stories and broadcasting the dreams to sleeping audiences. The antics concern Our Hero, a second-string Dreamer called in when the company's star goes berserk "on stage," sucking his audience into a Dream of Hell. Hero Wayne Corrigan enters the Dream in the guise of the Guardian, whose mission is to protect the audience from torment.

So far, so good. It's a story within a story, a Dream within a novel. The logic is the logic of dreams, so anything goes. Yet there is a single magnificent flaw. Much of the conflict in the novel centers on the "fact" that Dreams cannot be recorded, though they can be broadcast. There is thus no check on what the Dreamer chooses to show his audience, and disasters become both possible and probable, thus justifying the story. *But*—if something can be broadcast, it is a sequence of electromagnetic signals and it *can* be recorded. If a Dream can be recorded, there can be checks on the Dreamer. And Goldin loses all excuse for his story. Or at least, for *this* story.

How often is it that a story is made possible only by a gap in the logic of the background? Too often. Science fiction—and other—writers are all too fond of pulling rabbits out of top hats that are really only babushkas or yarmulkas. More accurately, perhaps, they take a story idea and cobble a background to fit, forcing the fit wherever their imaginations flag, or even failing to notice that the fit isn't quite right. In Goldin's case, I suspect he saw the problem, for he spends a fair amount of time on the recording issue. Yet he glosses over it in the end. Maybe he was just being cynical about his readers. Maybe he was being lazy. Maybe he was in a hurry.

Or maybe he was peddling an old manuscript from the bottom of his trunk. Most writers do that, once they have a name big enough to override some story shortcomings. I won't call him names for that. I will say you can find better buys than *Dreams*.

Robert Adams's **Horseclans Odyssey** is a lively tale of Machiavellian politics, Renaissance savagery, and Tartarish invasion set in post-holocaust America. It is also tiresome, largely because Adams has chosen to distinguish many of his characters with obsessively spelled-out individual dialects. This is fine, for he does indeed capture the sound of each speech, but too much of this particular good can put the reader off. It does me. There is a reason why most writers restrain their use of dialect to key words and phrases, focussing their efforts more on capturing the rhythms of dialects. A second benefit of this restraint is that it is more accurate, for dialect speakers can vary in their pronunciations according to education and experience, while the rhythm remains far more constant.

Odyssey is the seventh Horseclans book; more are planned. All are apparently popular with readers, so that we can fairly assume the excess dialect that bothers me does not disturb everyone. Either that, or Adams's readers find their excuse in the stories themselves.

Could be, folks. Take a look at this one. Plains traders kidnap three children of the Horseclans nomads and take them back East as slaves. Stehfahnah escapes as they cross the Mississippi and embarks on an adventure of survival during which she is captured and raped by a trapper and rescued by telepathic otters and a giant badger before returning to her tribe. Her brothers Djoh and Bahb

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remain captives until they are about to be sold to a Greek homosexual as bugger-boys, whereupon they too escape, in the company of a black eunuch, Nahseer of Zahrtohgah, to join the forces of the military genius Count Martuhn. Meanwhile, the Horseclans are preparing to move East in search of their ancestral homeland. When word of the kidnapping reaches them, the migration takes on aspects of jihad. And then there are conflicts between Count Martuhn and his overlord Duke Tcharlz, Tcharlz and his queen, Tcharlz and his neighbors, and so on. Thud and blunder aplenty, plot and counterplot, and all's well that ends well.

There *are* reasons to struggle past the dialect and the queer versions of ordinary names (which may actually bog you down worse than the dialect—they have so many extra letters!). Do that, and you find a vigorous action story. Yet there are so many such that I doubt the struggle to reach this one is really worthwhile.

Perhaps oddly, if Adams had chosen to make his book more accessible by using plainer names and clearer speech, I might not have chosen to review it at all. It would then have been a fairly ordinary potboiler. But I doubt he did what he did just to gain a reviewer's attention.

Drew Mendelson's **Pilgrimage** is an odd one. It gives us a massive City stretching across a far-future landscape. As its hindparts decay, they are dismantled and their parts are carried forward to build a new leading edge. The displaced people migrate forward as well, and the City actually crawls across the world. It has been doing so for millennia.

At the time of the story, the City's technology is failing. Marvels no longer work. Strange creatures appear in the corridors. The Earth trembles. Young Brann Adelbran, resident of Tailend, wonders, and when his people desert their ancestral halls for the frontward trek he and two companions dive into the City's depths to seek answers. They find them eventually, but first they must see that the City's Tailend had been the last bastion of normalcy, for all its obvious decay. The rest of the City is in far worse straits, for most of its people have degenerated to savagery and worse.

The novel isn't bad. It's highly visual, full of mind-boggling scenes, the product of an imagination that may show us many more wonders in years to come. The City is especially marvellous, however unlikely it may be. At first I took it as a metaphor for the human life cycle, but Mendelson buried that in details and incidents. The metaphor may in fact hold throughout the book, and a thorough exegesis might be a highly entertaining thing to read. You won't get it from me, though. I'll leave that to some grad student hungry for a degree. I hope he'll send me a copy.

Pilgrimage, Odyssey, and *Dreams* are all quest stories. This is a very—all too—common sort of SF novel. Add it to the straight adventure, and you include the bulk of all SF novels ever written. You can see this as readers, I'm sure. I could have, too, when I was just a reader, except that when I chose my reading I didn't delude myself into thinking I was choosing anything like a representative sample of the whole. As a reviewer, on the other hand, I *do* sample the whole. I become aware of the sameness. I grow tired of it, sick of it, bored! (Is this why Spider quit?) I ask myself, are there no other types of stories an SF writer can write or sell, no others the readers would enjoy? Is

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this monotony why short fiction seems so much fresher, so much better than novels? Or am I just plain peculiar? After all, anthologies and magazines do not sell as well as novels, which must mean the readers don't prefer short fiction. Or perhaps it means they simply want fresh scenes and events in big, novel-sized hunks, more or less regardless of plot. Perhaps they don't even notice the monotonous plots!

Of course, there are other kinds of stories. And when they're handled well, they're often the best. But the chases after grails and from villains are far more common, and I don't seem to be alone in noticing the problem. Suzette Haden Elgin has begun a trilogy, set on a far world colonized by Ozark hillbillies (or near enough). Magic works there, so that native "Mules" can fly and spells can be cast. There are political problems, for the twelve founding families are linked in a tentative confederation which some wish strengthened and some wish dissolved. The link is to be formalized with a Grand Jubilee as **Twelve Fair Kingdoms** opens, and someone is trying to queer the pitch. When the McDaniels baby is snatched out of church and hung in a treetop by magic, that does it. Young Responsible of Brightwater must meet this challenge by embarking on a full-scale Quest decked out in full formal regalia. She must ride stately on a Mule from Kingdom to Kingdom, seeking the evildoer and putting him on notice that she knows the proper forms. Others help out by seeing to it that she has her proper share of adventures suitable to a Quest.

Clearly, Elgin has her tongue in her cheek, which makes the story more than a little delightful. Her irony is emphasized as Responsible—who is young, after all—matures on her Quest and finds that another tack might well have served everyone better. I'm looking forward to the next two books in the trilogy. I want to see if Elgin can maintain her good-humored approach, and I want to see just how she does it.

I said some SF is non-quest and non-adventure. Some is, and it has its own problems, largely a lack of vigor, of excitement, or churning glands, which is just what many readers seek. Too, a story that is not oriented to action of some sort must satisfy on another level. It must offer original thoughts, philosophies, and reflections (if not original, they must at least be unfamiliar). It should be to some degree profound. And that is difficult to achieve. Few writers are capable of profundity. Few readers are, either, and even fewer may find profundity appealing in the stories they read.

Do I sound cynical? I am. I don't know you all. I don't even know many of you. I do know what you buy, and that does seem to justify the cynicism. Doesn't it?

I also have before me a book that seems to be a compromise between adventure and nonadventure. It's Stephen Leigh's **Slow Fall to Dawn.** Set on a poor colony world, it is the story of a guild of ethical assassins who notify their victims in advance, match weapons to defenses, and pursue only until dawn. If the victim survives to see the sun rise, he is safe until the next contract is issued. The assassins want to expand offworld, but the powers that be are reluctant to let them, for their ethics are in question. Are the assassins really as neutral as they claim? Do they *never* take sides? Is survival *always* decided by the fates? The issue will be decided by their behavior in a political feud, and it is in question when the party head they are aimed at survives.

There is action here, as assassins pur-

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sue their victims, but it is an action of incident, not of plot. The story itself is centered more on thought, on consideration of ethics, of consistency to principles. Yet it suffers the problem of inadequate profundity. Neither the assassins nor their problems are new to SF, and Leigh says nothing new about them. In particular, he says nothing to support the idea that assassins can ever serve a legitimate social purpose. Perhaps they can, but I would like to see the position argued more persuasively.

It's anthology time. The last month has brought me two Bests of the Year, a pair of continuing anthologies, a stand-in for a book-mag, and more. Let's see how many I can cover before I run out of room.

The Bests are Don Wollheim's **The 1981 Annual World's Best SF,** drawn wholly from the U.S., and Terry Carr's **The Best Science Fiction of the Year #10,** ditto. Both include Waldrop's "The Ugly Chickens," Martin's "Nightflyers," Varley's "Beatnik Bayou," and Leman's "Window." To these Carr adds eight and DAW six. Carr's picks include Simak's "Grotto of the Dancing Deer," an excellent tale from this magazine; Charnas's "Scorched Supper on New Niger," a nice story but still common enough in treatment to make one wonder what "Best" means; Swanwick's "Ginungagap," curiously unsatisfying; Dick's "Frozen Journey," an unlikely but well-rounded fable of half-sleep; Henderson's "Tell Us A Story," a late installment in her tale of the People; Malzberg's "Le Croix (The Cross)," a dream of delusion; MacIntyre's "Martian Walkabout," a predictable exercise in the "ancient astronauts" subgenre; Tiptree's "Slow Music," an unresolved minor chord; and Brown's "The Science Fiction Year," a compendium of snippets from *Locus*.

Wollheim adds Webb's "Variations On A Theme From Beethoven," a fairly satisfying portrayal of the education of the artist as a young man; Bradley's "Elbow Room," a portrayal of a fragmented personality on the brink of stability; Spinrad's "Prime Time," a silly scenario of life in a videotape loop; Tuttle's "A Spaceship Built of Stone," an invasion by dream; Coney's "The Summer Sweet, The Winter Wild," an oddity told largely from the viewpoint of a telepathic, pacific caribou; and Killough's "Achronos," in which the ages meet on a timeless beach.

Carr allowed himself more range in story length, up to novella, picked more tales, and gives us a fatter book. Perhaps his is the better buy. Yet Wollheim picked stories Carr didn't, and we must wonder if either book really has all the best of the year. I would prefer a hybrid of the two—let's have a third book with the Waldrop, Martin, Leman, Simak, Webb, Tuttle, Henderson, Tiptree, Coney, and Killough. We could surely add stories neither picked. It's a matter of taste, isn't it? Or is it? After all, Carr and Wollheim agreed on four of their choices, and I would keep three of them in my hybrid. You would overlap too, so the choice isn't entirely idiosyncratic. At the same time, taste does enter it enough to guarantee that two Best-listers will never agree totally. Perhaps the best a Carr or a DAW can do is hope for enough overlap to satisfy most readers that they are both picking Bests and enough difference to keep from competing with each other.

Original anthologists have an easier time of it. They aren't obliged to pick the year's best, though they do hope the Carrs and DAWs will vindicate their

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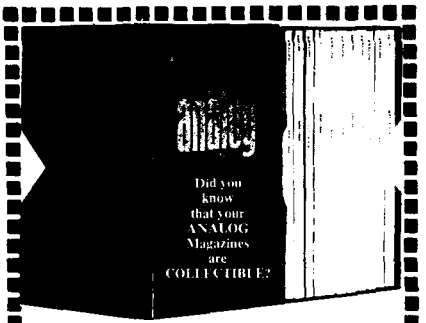
judgment later on. Often enough, they do. Waldrop's story came from *Universe 10,* for instance, and Carr has a chance to repeat that score with **Universe 11.** Nancy Kress's "Shadows on the Cave Wall" is an excellent study of how audience feedback might affect the writer's job. Michael Swanwick's "Mummer Kiss" is a painfully original post-holocaust America. Other good stories are Bishop's "The Quickening," in which people awaken one morning to find they have been scattered among uprooted strangers around the world in a cosmic break-shot; Robinson's "Venice Drowned," concerning the local effects of a rise in sea level; and Watson's "Jean Sandwich, The Sponsor, and I," in which subjects are recruited for an experiment in viral evolution.

Marta Randall and Robert Silverberg, with **New Dimensions 12,** may make it in the next round of Bests, though I don't think they can match *Universe.* Their best choice may be Gordon Eklund's "Pain and Glory," in which a family of empaths must seek some *modus vivendi* in the world. Another candidate is Peter Santiago C.'s "The Celebrants" of peace everlasting. But there are ten more stories in the book too. What of them? Most strike me as too neat, too pat. They wrap themselves up with a pat on the back and a refusal to look beyond to the outside world, or even to the outside literature. If they refer beyond themselves at all, it is in terms of a cliché (Swanwick's last line: "The battle for control of the human spirit had begun." Benford's: " 'Because I'm not a machine,' he said.").

I suggest that if you can afford only one of these books, get *Universe 11.* Carr is much more satisfying as an editor.

* * *



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Proteus is a collection of the late *Destiny's* misfits. As editor Richard McEnroe says, most of the stories were bought for that book-mag before Jim Baen's policies firmed up to exclude them. The rest are tales that usually get rejected with a "terrific, but it just isn't for us," to the writer's intense aggravation (I *know!*). Depending on which particular editorial fathead(s) uttered those rejections, this gives *Proteus* a very nice recommendation, which I now reinforce by pointing to Michael Swanwick's first sale, " 'Til Human Voices Wake Us," a neatly inconclusive combo of parapsychology and solipsism; Charles Sheffield's "Parasites Lost," a rousing chorus of "Bond, Bond, the piper's son. stole a pig and away did run . . ."; Ishikawa's "The Road to the Sea," a painfully ironic short fable; and Jean Karl's "Certain Fathoms in the Earth," on the rôle of the true reader in a world of *People* skimmers whose favorite ejaculation is "Watta pic!" (Shame on you, Easton!)

Very briefly now, I want to call your attention to C.J. Cherryh's **Sunfall,** a collection of novelettes set in Earth's far, far, future cities. All the stories share is a frame of mind, for the cities seem to set on very different Earths at times, yet the book is well worth your time. Cherryh demonstrates here that she is as capable of short work as long.

Marvin Kaye's collection, **The Possession of Immanuel Wolf,** is also worth reading. The title story is an anguished cry of age against youth, howled by a Hitlerian dybbuk. "Ms. Lipshutz and the Goblin" and "Packaged Ogre" remind hilariously of the long-departed *Unknown* (of whose imminent revival rumors persist). The rest are marked by a light approach to often serious matters, and most are pleasures to read.

Finally, we have one more "How To Write SF" book, this one from the editors of *Asimov's:* **On Writing Science Fiction: (The Editors Strike Back).** It offers discussions of general principles, followed by illustrative stories reprinted from the magazine, followed by specific comments. It's a useful volume, surely, and it reinforces my earlier comments on *Horseclans Odyssey:* "In the archetypical bad story, . . . the narration is . . . in almost opaque, imitation hillbilly dialect, and the result is both unconvincing and unreadable. . . . It takes very little in the way of dialect . . . or unfamiliar idiom to give the flavor of nonstandard speech." ■

● Common sense is that layer of prejudices which we acquire before we are sixteen.

Albert Einstein

● Science is nothing but developed perception, interpreted intent, common sense rounded out and minutely articulated.

George Santayana

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Jay Kay Klein's biolog

Eric Vinicoff

The practitioners of science fiction spring from an amazing variety of educational backgrounds. Eric Vinicoff has a Juris Doctor degree awarded by the University of San Francisco, and though a licensed attorney much prefers the writing of science fiction to the occupation of barrister. With some two dozen sales to his credit, Eric is currently employed full-time by the Social Security administration in San Francisco. Interestingly enough, it's his sister who writes legal textbooks.

He grew up in Harrisburg, but moved to the West Coast in time for high school and a subsequent BA in Political Science at the University of California at Santa Cruz. The interplay of forces and personalities as individuals and groups jockey for position fascinates him, and this interest in politics shows in his fiction. Eric's first published story appeared in the June, 1975 *Analog* after two years and four rewrites. Five issues later, a second story appeared. Both were collaborations with Marcia Martin. He feels that together they had a broader viewpoint, four hands to share the load, and two distinctly different minds to create a more intricate work of imagination.

Eric devoured all the science fiction he could get as a child, including comics as well as Heinlein juveniles. He has been to many conventions and as an undergraduate published a fanzine with a literary flair. Along with others raised to look at the present not as an eternal *now* but as the prelude to future events, he sees today's trends leading to tomorrow's troubles. Reflected in his fiction is an expectation of increasing American/Soviet conflict over scarce resources, of which oil is merely the first. Likely economic and political collapse of the Third World. An end to space exploration except for near-Earth military applications. Movement worldwide towards various varieties of totalitarianism.

Another interest is gamesmanship and a fascination with games of chance. The world of politics, of course, is its highest expression, with the greatest stakes. For smaller and more immediately determined outcomes, Eric enjoys visiting Las Vegas. One may expect Vinicoff-built story universes to be intricate weavings of social trends and complex personalities. These are painstakingly plotted with the author relaxed in bed and then slowly handwritten prior to a final typescript.

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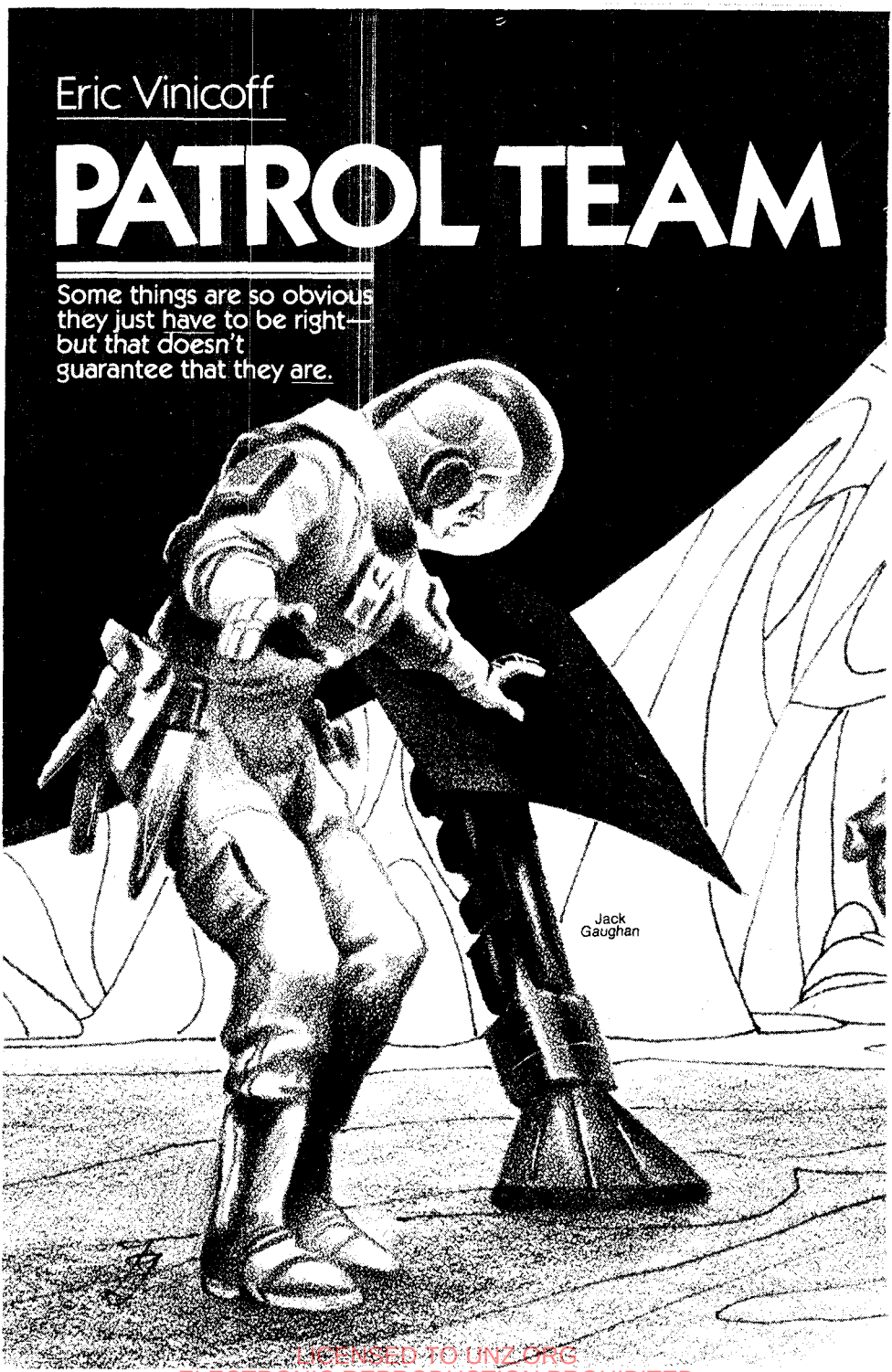
Eric Vinicoff

PATROL TEAM

Some things are so obvious they just have to be right—but that doesn't guarantee that they are.



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Tadashi sucked hot tea from his z-g cup and stared at the control station's hologlobe; the straps kept him from drifting out of the seat. He had been staring at it for most of the past fifty days. He didn't have to. He had seen everything there was to see in the first five minutes, and Marta was making much more precise observations. But he couldn't turn away.

"Any word yet from HQ?" he asked. His voice rang in the cramped lifespace.

"I wish you would cultivate another form of nervous release besides wasting my time with stupid questions." Marta used the headrest speaker to grumble in his ear. "You'll hear about it a handful of nanoseconds after I do."

"I've always said you were a fast woman. Any developments on our friend out there? Something that might help us get through to him?"

"Him? Why not her? And the answer is no. I've upped the data pulses to Charon Base to one per hour, but none of it's what you would call headline news."

"I hope the Admiral gives the okay. This standoff is getting old."

"Drink your tea, darling."

In the bottom of the hologlobe floated a small dirty white ball. AN622132 —Annie in their non-technical discussions—was a boringly ordinary comet; 1.6 kilometers in mean diameter, a shell of ice and frozen gases around a core of nickel-iron boulders. None of which explained the UO's interest in it.

One hundred and seven days ago Marta and Tadashi had been cruising through this section of the cometary cloud on a three-year resupply mission to the Borderland research stations. Then had come the message from HQ—an unidentified object was entering the solar system. A squadron of scientists and politicians was on the way, but they were the closest Patrol vessel. So they drew the job of welcoming the human race's first out-of-town visitors.

It had zigzagged several times near the end of its decelerating course, as if searching for something, then zeroed in on Annie. *PSS Callisto* had arrived three days behind it. Since then they had floated ten thousand kilometers apart and about half that distance from the comet. Marta had tried every possible form of communication without eliciting any reaction. The UO was emulating a clam, and a dead one at that. It wasn't making much of an effort to be social.

Its Marta-enhanced image occupied the middle of the hologlobe; a kilometer thick white teardrop with a wide hole through the long axis. Its awesome drive was shut down now, but the readings during its arrival had suggested something much more powerful than *PSS Callisto*'s fusion/ion engines, maybe even MC^2. If that energy was also packaged in weapons under the control of nasty dispositions . . .

"The pulse from HQ just came in."

"Run it," he said at once.

The Admiral flickered into the hologlobe, looking as impassively calm as ever. "Greetings, Lieutenant Commander Nakagawa and *PSS Callisto*. Thus far your performance under most extraordinary circumstances has been exemplary. Admiral Kobel's squadron will rendezvous with you and the unidentified object in twenty-seven days six hours and eight minutes your time.

"Your request for permission to make

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closer observations of the unidentified object is granted. But you will approach no closer than one thousand kilometers, take no action which could possibly be interpreted as hostile, and withdraw at once if the unidentified object initiates any hostile action. Admiral Yamasaki for the United Nations Patrol Space Arm. Endcom."

Tadashi recorded his acknowledgement, and Marta fired it from the big laser toward Charon Base. He forced a deep breath into his suddenly constricted chest.

"Your pulse and respiration are climbing into the red," she said.

"If I wasn't such a hard-headed realist I'd say I was feeling the cold breath of mortality on the back of my neck. Hell with it. Take us in to one thousand kilometers from the fat end of the UO. Slow and easy."

"Like making love to a spiny sea urchin. Stand by for acceleration."

The UO-dominated space scene had refilled the hologlobe. He resumed his staring. What the hell did it want way out here in the cloud?

The silver teardrop began to swell. Long minutes oozed away. It still showed no interest.

When *PSS Callisto*'s drive shut down he could see it much more clearly. Only there wasn't much more to see: just smooth undetailed surface.

"Well, we've rung the doorbell. Anybody home?"

"Not so you would notice."

"You're sure no one is trying to talk to us? Are you monitoring every possibility?"

"Yes and yes. You want me to run down the list? Some commanders have been known to trust their partners."

"Sorry. But this is frustrating as hell. Here we are, front-row center for the biggest event since the discovery of sex. Something ought to be happening. Maybe we should try the laser com again."

"Bad idea. Orders, remember? At this range it could be mistaken for an offensive weapon."

He sighed and took another sip of tea. "So we just wait and watch. Any better heat radiation readings?"

"Not yet. The interior temperature seems Earth-like, but I can't tell you whether Eskimos or Arabs would find it comfortable—"

That was when the universe fell on him. He had a thin slice of a second to wonder what the UO had hit them with, and to get a scream up from his lungs into his throat. Then everything ended.

"Tadashi, dear. Wake up."

If it had been anyone else but Marta he would have tuned out. But he crawled up. He wrestled with the pain, held it at bay and kept climbing.

His eyelids trembled open.

He was slumped in the seat, held by its straps. Slumped? That meant gravity—about eighty percent of g, he guesstimated. What the hell had happened? Was happening? Would happen? He tried to swallow his fear, but it was too big. It wouldn't go down.

The lifespace looked reassuringly intact. He was breathing (apparently) good and plentiful air. But the systems panel glowed like it had been decorated for Christmas, with a lot more red readouts than green. The hologlobe was empty.

PSS Callisto wasn't—in fact couldn't

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be without several hours of repair work—accelerating under its own power. So where was the "gravity" coming from?

The back of his head throbbed with distant, drug-subdued pain. It must have slammed against the padded rest with enough enthusiasm that the padding hadn't mattered. His thoughts were requiring more than the usual amount of effort, but that could have been the drug.

The only other pain that rose above the generally bruised and battered level was the medprobe the chair had stuck into his left side. "Am I going to live?" he asked.

"Well, your injuries won't kill you. Nothing worse than a mild concussion. If the situation was less urgent, I'd advise a few days in the med-unit." He could tell that, despite Marta's casual tone, she was worried. "I've given you enough first aid for now."

"Then would you please yank your vampire fang out of me so I can start doing things?"

She obliged.

"Fill me in fast," he said as he studied the systems readouts more closely. She had already begun repairs, and all the damage seemed repairable.

"The way I see it, the UO grabbed us with an artificially generated magnetic monopole."

"A what? I thought monopoles were strictly a theoretical abstraction."

"Live and learn. Anyway, the jolt that knocked you out was *Callisto* being yanked toward the UO. The field also did most of the damage to our electronic systems."

"Magnetic mon—" The word turned sideways and stuck in his throat. Marta was essentially an array of mag-bubble microchips. He had never thought that anything could hurt her. But she was more vulnerable than people to certain things. His karate-callused fingers were putting hairline cracks in the plastic armrests. "Are you all right?"

"Of course I am. I'm well shielded. But thanks for the concern—even if it is somewhat late in coming."

Her snideness reassured him. "Go on. Where are we now?"

"Remember the wide shaft through the middle of the UO?"

"Yes."

"We were sucked into it. About halfway through a portal opened in the shaft wall. In we went."

"We're . . . inside the UO?" The cold certainty of disaster that had been with him since waking up hit peak load.

"I'm afraid so, darling."

"That explains the acceleration. I wonder where we're going?"

"Nowhere. What you're feeling isn't acceleration. It's some kind of field effect—the instrument readings are extremely odd."

"I hope we run across something our hosts *can't* do. It'd be good for my morale." He found himself staring at the empty globe. "Is the holo out?"

The globe filled with image.

The bow camera was showing one end of a big, dimly lit compartment. A BIG compartment—*PSS Callisto* was an oblate sphere one hundred and ten meters in its major diameter, but it sat in the middle of the floor with plenty of open space all around. The walls and floor were dark gray. The murky illumination seemed to come from the

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whole ceiling. Equipment-shapes lined the walls.

"Why is it so dark?" he asked.

"It isn't. There's a lot of ultraviolet being radiated. Our hosts must have a different vision spectrum."

Suddenly he remembered what should have been his first thought. "Did you get an update pulse off to HQ?"

"I tried. But the monopole knocked out the laser sender until we were inside.

"Look alive," she added suddenly. "A reception committee is arriving."

There were six of them, riding on the front of a vehicle somewhat like an oversized golf cart. It parked under the swell of *PSS Callisto*'s hull, and they scrambled off. They stood beside it, staring up at the ship.

Start with a gorilla. Stretch it so it had stubby legs, a long hunching torso, a massive chest, and powerful arms. Give it a flattened bullet head with no visible neck, a broad mouth that somehow worked without a movable lower jaw, a button nose, and wide-set bulging eyes. Carpet it with toe-to-pate shaggy pink fur banded irregularly in pale blue, except for black flesh on the face and the paw-like hands. Dress it in a brown belt-and-sash harness holding lots of small things that might have been tools. You could have passed off the result as a distant cousin of the aliens.

"What are they breathing?" he asked softly, unconsciously and irrationally afraid they would hear him.

"Pretty much the same as you. A bit more oxygen and CO^2, less nitrogen. But if you're thinking of going out there you'd better bundle up—it's a nippy forty-six degrees F."

Several of the weird mouths were moving. "Are you picking up any voices?"

"Yes. Here, have a listen."

They were very high-pitched and slurry, the way human voices sounded when speeded up and reversed. From time to time one of them would jump up and down, making odd gestures with its arms and bare paw-feet. Under other circumstances he would have laughed.

PSS Callisto was totally under the hypothetical thumb of the aliens. What did they want with it, its crew, Annie, and the solar system? What could Marta and he do to extend their own lifespans? What were the six pink apes saying to each other?

He got tired of asking himself questions he couldn't answer. They weren't helping his mood. "What do you think about our next move?"

"You're the commanding officer."

"You pick the damnedest times to remember that." He sighed, unstrapped, and stood up. "Once more into the breach, dear heart."

He shinnied into his gleaming white EVA suit. "A bit formal for a social call," he admitted. "But I'll feel warmer and more secure out there with my private microcosm."

He looked longingly at the arms locker, but Marta said, "Don't even think it. Do I have to replay Admiral Yamasaki's orders?"

"I'm walking into a totally unknown situation. I might need some leverage."

"And you might start an interstellar war. Go out and turn on the charm."

"Grrr!" He buckled on the helmet, ran the systems check, and flipped on the com. "Flash Gordon calling Ming the Merciless."

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"Coming through loud and clear. But your suit com won't operate through bulkheads. Better take one of my remotes—you can link your com to its neutrino 'ceiver, and I'd certainly appreciate the firsthand data."

He thought about not having any way to talk to her, and took three of the book-tape-sized plastic cases from their recharge racks. Activating and setting up the link through one, he hung all three from his equipment belt. Then he took a deep breath. "Let's do it."

He rode the speedlift down to the lock. The ugly little compartment full of EVA gear looked so lovely that he wanted to linger. But she asked, "Ready?"

"More or less."

The plug hatch moved in and sideways. The ramp snaked out and down. He stared into the gloom, keyed up to react to anything that happened. Except for what did, namely nothing. Switching on his outside pickup, he heard distant equipment noises and the high-pitched slurry voices. But he couldn't see the pink apes—they were around the curve of the hull.

"You going to stand there until the leaves turn?"

He took the first step onto the ramp, into the alien air, under the alien light, inside the alien starship. After the first one they became slightly easier. The floor looked and felt like metal, but was textured like concrete.

He turned at the foot of the ramp and followed the looming cliff that was *PSS Callisto*. "Any suggestions how I should go about this? Walk up and say hello? A white flag?"

"Let them see you, but keep your distance and don't do anything that would make a paranoid nervous. Let them take it from there."

The dark vagueness was as scary as it had been in his room at night when he was very young. He thought about turning on the helmet light, but her advice made sense.

He emerged into full view of the pink apes.

He was about thirty meters away from them. The rapping of his boot heels heralded his arrival; they turned and looked at him.

They all started jumping, gesturing and shrieking at each other. So he switched on his speaker mike and said, "Hi there."

They didn't react noticeably. Maybe they couldn't hear him. He tried a high piercing whistle, but they didn't react to that either.

"This isn't quite the way I've always imagined first contact," he said softly into the com. "You think they're talking about us?"

"Arguing, more likely. Or maybe freaking out." She was listening and watching through the active remote.

"Maybe I—"

If they were arguing, they abruptly came to a decision. Four of them walked toward him, their short paces clumping on the deck. The other two were reaching for something in the open back of the vehicle.

Combat conditioning brought him to knife-edge alertness. "I don't like this. They don't seem to share our concern about avoiding hostile appearances."

"Don't jump to conclusions. Stay loose."

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They were twenty meters away, and not slowing down. He began taking steps backward. But the gap kept closing.

"Four against one," he muttered. "Four monsters, too. But at least they aren't waving guns." Behind them he could see the other two hauling out what looked like a meter-long roll of clear plastic.

"You can't fight them," she said sharply. "Think of the consequences, not to mention our orders."

Sometimes her viewpoint could be irritatingly objective. "If they start something, I'm going to do my damnedest not to be finished by it."

They were almost on top of him. Looking up at them, the size difference seemed to grow beyond reality or even sanity. Patrol unarmed combat technique was the distillation of martial arts thousands of years old, but he didn't want to have to try it against these alien King Kongs.

"Run, idiot!" she snapped.

His feet immediately decided they liked the idea. He spun and tried his forty-meter dash form in the bulky suit, yelling, "Get ready to seal the lock hatch on my heels!"

Three strides into his dash the universe fell on him again.

He hit the deck head-first and hard. His back felt like someone had hit it with a forge press, despite the suit's ample padding. Somewhere in the distance Marta was shouting at him, but he couldn't make out her words.

Two hirsute tree-trunk arms lifted him easily clear off the deck. He felt vaguely embarrassed at having lost without putting up a fight, but it didn't really matter. Nothing mattered.

The world spun, and he almost retched. His semicircular canals protested vigorously. He was upside down, moving and bouncing, slung over the shoulder of a pink ape.

The side of the vehicle appeared. A karate chop to a furry kneecap would have been a tempting option. Unfortunately, he couldn't move a muscle.

Paw-hands unrolled the "plastic" under him. He realized it was some kind of sack just as he was dropped in.

He folded into a limp lump in the bottom while one of the pink apes sealed the top. Hardly a dignified way to treat an envoy, but he was in no shape to do more than resent it. So he hung around and moaned.

They tossed him unceremoniously into the back of the vehicle. The forge press took another shot at his spine. The fireball of agony climbed up to his head and blossomed intolerably.

He must have blacked out, because when he became aware of his surroundings again the vehicle was moving. He was lying half-curled on his side, still in the sack. Above the vehicle rim he could barely make out a high ceiling of something that glowed dimly white. The vehicle was speeding along with very little sound—the external pickup was still working.

He felt about three quantum levels below shitty. Nothing would have pleased him more than to slide back into the painless dark. But he couldn't. Because he might never wake up. Because he had duties to perform.

And because Marta was yelling at him to snap to.

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"Uh . . . okay . . . shut up," he mumbled.

"Give me your name and rank."

"Huh?"

"Don't go veg-on me, darling. Name and rank."

"Uh . . . Lieutenant Commander . . . Tadashi Nakagawa. And the square root . . . of four is two. Good enough?"

"It's a beginning. I gave you a stimulant and a painkiller through your suit-med. Your back will need more serious attention later. But you should be ambulatory for the duration. More good news—your suit held up better than you."

The broken-back agony was still there, but it was beginning to numb. He figured he could move if his life absolutely depended on it. Which seemed probable. "What the hell . . . is going on?"

"You're being taken toward the bow of the UO. You've been out for a little over seven minutes."

"I wasn't the . . . least bit hostile."

"True. Their reaction is mystifying. We definitely need more data."

"The floor is open to suggestions how I can . . . survive long enough to gather it. Do I continue to emulate a doormat?" he finished sourly.

"Under the circumstances I think we can begin improvising. Section 202(j), field discretion."

"I'm so glad you agree. Step one is getting out of this bag." There was hardly any room inside it to move around, but he managed to bring his legs up. He kicked the "plastic." Again and again, straining until sweat ran stinging into his eyes and his spine screamed. The sack didn't even scratch.

"This isn't . . . going to be easy." He dragged his right arm up to the suit equipment belt. Sliding the duralloy knife from its sheath, he fumbled and almost dropped it. His fingers were full of little icy slivers. "Let's see how tough this stuff really is."

He hacked at it. It was stubborner than anything that thin and flexible had any right to be. But finally he shoved the point through. Long, tortuous minutes later he had a slit big enough to crawl out. Which he promptly did.

"Now what?" she asked, echoing his own thoughts. He was sharing the back of the vehicle with a jumble of objects, some recognizable as repair tools and materials, others unidentifiable. The pink apes were sitting up front—he could see the backs of their heads. If any of them turned around, his escape would be spotted at once. But they seemed remarkably uninterested in him. One more mystery to add to the list.

"I'm going to risk a peek over the rim and see what's what."

"Go ahead, be selfish," she pouted.

Grumbling, he managed to unhook the active remote from the belt. Then he crawled to the rear of the open cargo compartment. Cautiously he snaked up the gray metal to its top, about a meter and a half from the deck, and looked out. He held the remote's eye just above the rim.

The vehicle was speeding along a corridor the size of a shopping mall, its surfaces predominantly blue but indistinct in the poor light. There were many doors, and occasional tantalizing glimpses of things beyond open ones. Other corridors branched off at regular intervals. It was damned hard to re-

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member that all this was inside a starship 5,000 AUs from Earth.

The vehicle wasn't alone in the corridor. The traffic wasn't heavy. But it was fascinating.

A smaller disk-shaped vehicle whipped by going the other way. Through its wraparound windshield he saw two beings that looked somewhat like waist-high biped lizards. One of them was driving.

He was about to comment to Marta when flapping sounds made him look up. Two undulating, green—creatures—flew past overhead, carrying something the size of the vehicle in a webbed sling between them.

It got even better. In the next few minutes he counted at least nine wildly distinct types of aliens. Some, like the little lizards, seemed more plentiful than others. Pink apes were almost as common.

"The Galactic Patrol," he muttered, mostly to himself.

"You're suggesting a similarity to Doc Smith's literary creation?"

"Why not? No one planet could produce so many different intelligent races."

"Insufficient data. But feel free to speculate away. I always find monkey imagination fascinating."

He started to form a reply, but it died in his throat. The vehicle was curving toward a hangar-size doorway. The dark twin slabs pulled apart to admit it, then clanged shut.

The dim light was now blue. Ice blue. Damned appropriate, he thought. Though hellish red would have been, too.

The new corridor was much narrower, and it went on and on. A helmet readout told him the temperature had dropped to a brisk twenty-one degrees F. The pink apes didn't seem to mind—their breaths didn't even mist up.

The walls were twin rows of metal shelf units behind doors made of something like glass. He extrapolated from those he could see, and made a guesstimate of at least several hundred shelf/door arrangements. The panes were heavily frosted over, but he could make out the contents of some of the shelves.

Bodies. All the same species, and unlike any of the aliens he had already seen. Humanoid, but scarcely a meter and a half tall, extremely bulbous, and wearing either loose white skin or a coverall garment. The heads were ungainly globes hanging from long, slender necks; hairless and starkly white. That was all he could be sure of as he peered at one horizontal form after another.

He tried to say something, but his voice squeaked. Trying again, he got out, "Several possible explanations come to mind—none of them pleasant."

"Rein in your morbid imagination, darling. Let's stick to logic."

"I'll try, but it won't be easy. What in hell *is* this place? A cold sleep facility for some of the crew?"

"No. That's one possibility you can eliminate."

"Howcum?"

"These remote sensors aren't as sharp as my inboard equipment, but they get the job done. The bodies aren't in reduced animation. They're stone-cold dead, if you'll pardon the pun. Suspended animation is out too—they aren't being kept cold enough to prevent cell deterioration. The refrigeration system is the simple kind you would expect in

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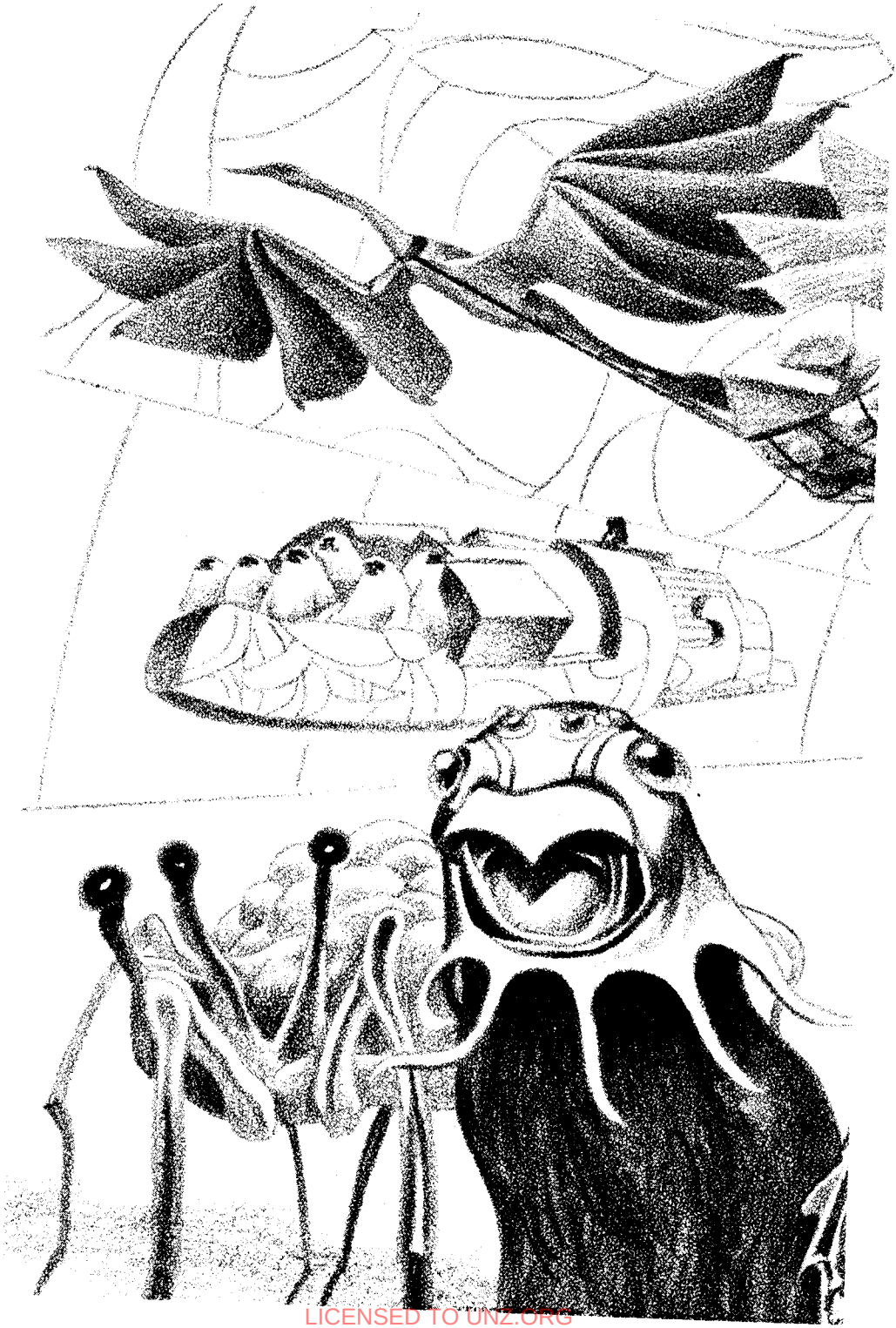

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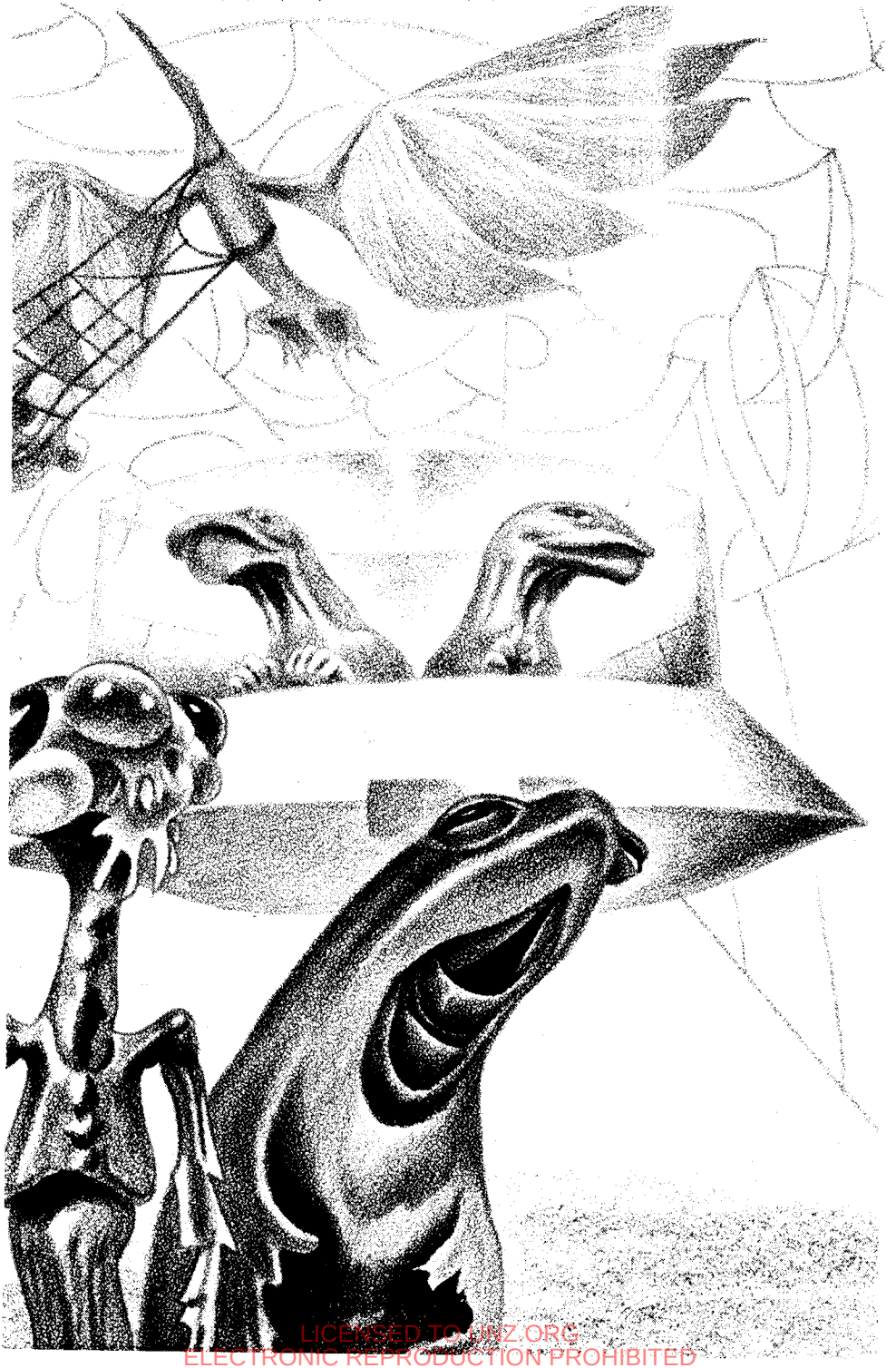

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a cold storage vault."

"Or maybe a meat locker? Well, I don't care to advance our interstellar relations as either a specimen or an entree. I—"

The vehicle braked sharply to a stop, almost knocking him down. It had reached the interface between occupied and unoccupied shelves. That told him all he needed to know.

Without waiting to consult with Marta, he hurdled the rim. He hit the roadway with such a metal-to-metal clatter that he gave up all hope of secrecy. Instead he emphasized speed, all he could manage in the suit and in his damaged condition. He headed back the way the vehicle had come. Returning to the ship didn't seem to be a reasonable goal, but it was the only one he had.

"Where are you going?" Marta demanded. His remote-holding hand was pumping up and down—she was getting a rather confused view.

"Anywhere but . . . one of those shelves!"

He heard the *slap-slap-slap* of bare paw-feet closing in on him from behind. He knew he wasn't going to be able to outrun them. He thought about the tools on his belt. This time he wasn't going down without a fight.

As usual, she was two steps ahead of him. "Nothing you have will stop all six of them before they can take you. Activate one of the spare remotes and drop it."

He knew what she had in mind, but he couldn't believe it. "What the hell happened to . . . the order about no hostile action?"

"I've figured out what's going on here, and we won't be violating orders. No time to explain now. Trust me, darling."

He trusted her, and he wanted to survive. So he switched on one of the spares hanging from the belt, then dropped the one in his hand. He wanted to free the hand for other uses, just in case.

He staggered on to what he hoped would be a safe distance, over a hundred meters, then stopped and turned. He could barely stand.

All six pink apes were pounding down the corridor toward him. "What if . . . they don't stop?" he gasped.

"I can take them out *en passant* if necessary. But they'll stop. Watch and see."

He hated it when she was smug and mysterious. And right. Sure enough, they all stopped. One picked up the remote.

She waited a few seconds that aged him a few years, undoubtedly collecting all the data she could. The pink ape started to drop the remote in a small bag attached to the front of his harness.

Then she cut loose.

The remote's power source was a "gas" of artificially created positrons stored in a magnetic bottle. She shut down the bottle.

The resulting explosion was puny by MC^2 standards, but it broke panes and bent metal for thirty meters in both directions. It knocked him down and sent his head on another trip to agony-land.

Where the pink apes had stood there was only a crater-dent in the roadway. A greasy blue film covered the nearby surfaces.

He got up and started to stagger away, but Marta said, "You'll never make it

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on foot. Try the vehicle."

"Good idea." He headed back at the top speed he could manage—slightly better than a brisk walk. He skirted the crater, and tried to ignore what the blast had done to the nearest bodies. Every second he expected a horde of avenging aliens to descend on him, weapons blazing. But no one showed up. This seemed to be a lonely corner of the mammoth starship.

He jumped into the open front of the vehicle. He had worried about figuring out the alien controls, but that turned out to be no problem. There was just one—a joystick. He settled onto the oversized seat in front of it, and began experimenting.

Push forward, go forward. Farther, faster. Back to brake, then reverse. Sideways, turn sideways.

Simple in theory, but tricky to get the hang of. He kept scraping the glass doors as he sped back along the corridor. He managed to cross the crater without tearing up the fat tires.

"What do I do about that?" he asked as he saw the doors to the big corridor approaching.

"Look for a control to open them. Do I have to tell you everything?"

"THERE AREN'T ANY DAMNED CONTROLS!"

He pushed the stick as far forward as it would go, determined to get through one way or another. It was a sign of his mental state that he didn't wonder if he would survive the experience.

He never got the chance to find out. When he closed to within a hundred meters of the two slabs, they opened on their own. The vehicle hurtled into the big corridor. He frantically braked and turned, and barely avoided crashing into the far wall.

"Can you guide me back to the ship?" he asked. "I was out cold for most of the ride."

"And the remote was pinned under you. I didn't see a thing. But the inertial tracker gave me a rough course description. That might be good enough."

"If not, I can always pull into the next gas station for directions."

He set off along the corridor, trying to match the pink apes' speed. He didn't want to attract any attention. But driving the open vehicle he didn't see how he could avoid it. He had the corridor to himself for the moment, but he expected that to change at any time. "Maybe this alien menagerie will take me for just another odd type."

"If my analysis is right, you have little to worry about. Most of them will totally ignore you. But watch out for other pink apes. They'll try to catch you again—maybe you can outrun them. And . . . well, there might be another type of alien who will try to stop you."

"How do I spot it?"

"It'll be armed. It'll probably start shooting at you. But it might not exist."

"How reassuring. What—" His voice froze as a disk-ful of lizards drove past going the other way. They must have seen him clearly. He waited for sirens and alarms. But nothing happened. "What exactly is this analysis of yours?"

"Explanations can wait. Keep your mind on your driving, and pray that I'm right."

More aliens drove, flew, and walked by in full view of him. None showed the least bit of interest. He felt like the Greek's sword was hanging mere cen-

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timeters over his head. Things weren't making any sense. Marta was watching their route and telling him when and where to turn. He was soon totally lost. Fortunately no pink apes or gun-toting aliens crossed his path.

He came to another tall doorway, which also opened automatically. In he went.

He had returned to the vast airlock/spacedock compartment. There sat *PSS Callisto,* big as life and apparently untouched. His troubles were far from over, but his confidence quantum-jumped.

"One last step," Marta said. "Maybe the hardest. I've made emergency repairs so we can launch, but we have to find the lock controls and solve them. Drive along those wall consoles over there, and hold the remote up so I can get a good look."

He would have preferred to head straight for the ship and consider the problem of escape from its secure environment. But her logic was irrefutable, as usual. He cruised slowly past the Picasso-esque consoles, hoping she was getting more enlightenment from them than he was.

"That one looks promising," she said. "Stop and take the remote over."

Up close the amalgamation of metal, weird symbols, displays, and things that might have been pressure-sensitive switches still made no sense. But Marta said, "Use your cutter and open the board just above those three round displays in the upper right corner. Carefully."

"Why?"

"I figure this is part of the lock control system. You're going to wire the remote to it, so I can try to coax it into letting us out."

That sounded like a big bite even for her, but he unhooked the diamond-edged tool from his belt and started carving.

He peeled back a flap of the light flexible metal, revealing a mica-like surface covered with printed microcircuitry. "Get the remote in close," she said, "so I can see what's what."

He did, and she took a disturbingly long five seconds making up her mind. "Okay, open the remote and yank the audio leads."

Since that would mean losing his link to her, he activated the last remote on his belt. Or tried to. "We have a problem."

"I'm not getting a second signal, if that's what you mean."

"Exactly. Somewhere in the rough-and-tumble the remote must have been damaged. What now?"

"Proceed with the plan." She explained the connecting operation in detail.

"But we'll be out of touch." That worried him more than he wanted to admit. "What if something goes wrong?"

"Improvise."

"Maybe I—"

"Move it, darling. I think I hear something out in the corridor."

He glanced at the doorway, but it was still closed and he was still alone in the huge compartment. Then he tore the back off the remote and went to work. The silence in his earphone shouted at him.

He kept looking at the doorway, wondering what was outside. And hoping

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it would stay there.

The suit gloves made the delicate job just this side of impossible, but he kept at it. His options were to make do or take up permanent residence. His toolkit supplied the equipment he needed. Marta's instructions had been precise, but he kept coming up with questions he had to answer himself. His injuries and the sweat stinging his eyes didn't help his concentration.

Yet, when he finally finished, his chronometer said only four minutes had gone by. The remote was glued to the console, and four wires ran from it to points on the exposed circuitry.

He was wondering if there was any way to test his work, short of returning to the ship, when the tall corridor doors swung open. In came another vehicle like his, carrying six pink apes.

Behind it came an even bigger open vehicle loaded with a dozen . . . well, they made the pink apes look puny and pretty by comparison. He caught a quick glance of bulky biped shapes, grey armor-plate hides, tusks, and paws holding what looked like 60mm laser cannons separated from their turret mountings. Then he was running for *PSS Callisto*'s lock, zigzagging and praying.

If Marta was on the ball— Before he could finish the thought he heard the hum of the com turret reorienting. He risked a quick glance over his shoulder.

The com laser fired twice. The invisible pulses punched holes through both vehicles, stopping them dead. Their occupants went flying, landing gracelessly on the hard deck.

While they staggered up to continue the chase afoot, he rounded the ship's hull and dove into the lock. When it cycled shut behind him he felt relief too strong for words. He might live a little longer after all.

CRAAANG!

The noise from the outer hull startled him, but only for a second. Let the monstrosities fire away. Nothing even they could carry could damage the hull. But there was no telling what heavier artillery they might bring up momentarily. He hurried up to the lifespace and strapped into the seat. "Status!"

A chunk of the compartment filled the hologlobe. All twelve of the bigger, uglier aliens were firing at the lock. The bursts of blue light were something new and impressive in energy weapons, but they weren't making much headway against fifteen centimeters of duralloy. The pink apes were just standing and watching. "Welcome back," she said cheerfully. "The remote hookup is working fine. The lock control computer is a very strange bird, but I'm getting to know her."

"Those goons could have killed me! Why didn't you blast them!"

"Calm down. You weren't in any immediate danger, or I would have. I'm not an advocate of needless slaughter."

None of this was making any sense. The ease with which he had waltzed through the starship didn't jibe with the awesome intelligence it represented. "So we get out, maybe, and they blast us with their big guns."

"No. There still isn't time to explain. We have to launch before the pink apes spot the remote. They'll remove it as soon as they do, and we'll be stuck here."

"What about the monopole? Can you shut it down?"

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"No. I haven't been able to solve the interface between the systems. But I don't think it will activate for an outbound ship. We'll see."

He wasn't convinced. But he didn't have a better alternative. He certainly didn't want to stay for any more fun-and-games. And if the hypothetical big guns did cut loose, he would probably never know it. "Are we ready for launch?"

"Aye, aye."

"Do it!"

A huge round hole appeared in one wall, revealing what had to be the inside of the starship's central shaft. Yet there was no sign of air—or aliens—rushing out into the vacuum. Then something invisible picked *PSS Callisto* up and shoved it through the hole.

The starship had finished gulping down Annie a few days ago. It had been one hell of a sight. For almost two days it had hit the comet with some kind of field effect that set up a resonant frequency. Annie had vibrated, shaken, and finally crumbled. Then it had *flowed* like a waterfall into the hole at the fat end of the teardrop. All the millions of tons of it.

In the days since its hearty meal the starship had burped many times, spraying debris out the tapered end. Marta had scooped up samples with a probe and determined that they were rock and mineral tailings from Annie.

Now it was accelerating at over three g's, leaving the solar system in a continuation of its tangent approach. *PSS Callisto* didn't even bother to try matching that pace. It was now just a point of light in the hologlobe.

"Why?" he asked again, sipping his tea and scratching the bald spot on the back of his head, where the med-unit had tinkered for almost a week.

"Try to get used to mysteries," Marta suggested.

"Admiral Kobel's scientists could be right. It could have been refueling. Metals, water, gases and so on; all in one convenient package."

"Or it could have been doing something totally beyond our experience. Don't anthropomorphize."

"You should talk." He chuckled. "Well, now we sit and wait for Admiral Kobel. All that effort, and she missed the whole show. Is she still angry?"

"I assume the question is rhetorical."

He sighed. "We aren't going to be popular with HQ either when my report arrives. We turned first contact into the biggest fish story in history."

"Don't worry, darling. They'll have my report too, and they know I don't lie or make errors in judgment. We did everything possible within reason."

The point of alien light was now lost among the spray of stars forever. He took another hot, satisfying sip. He was beginning to realize that their troubles were trivial compared to their continued status as living beings. For a while there, reluctant heroes' deaths had seemed to be their karma.

"I'm glad you didn't tell me your theory when we were in there," he said after a long silence. "I'm not sure I believe it now—it sure as hell wouldn't have done anything for my nerves then."

"That was a consideration."

"Don't be so damned smug. If Ko-

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bel's experts and computers hadn't backed you up, we might have come to regret escaping. Not to mention that you gambled our lives on some pretty tenuous extrapolation."

"I resent that. As Sherlock Holmes used to say, once you eliminate the impossible, whatever remains—no matter how improbable—must be the truth."

"But they're *aliens*. How can you know for sure *anything* is impossible?"

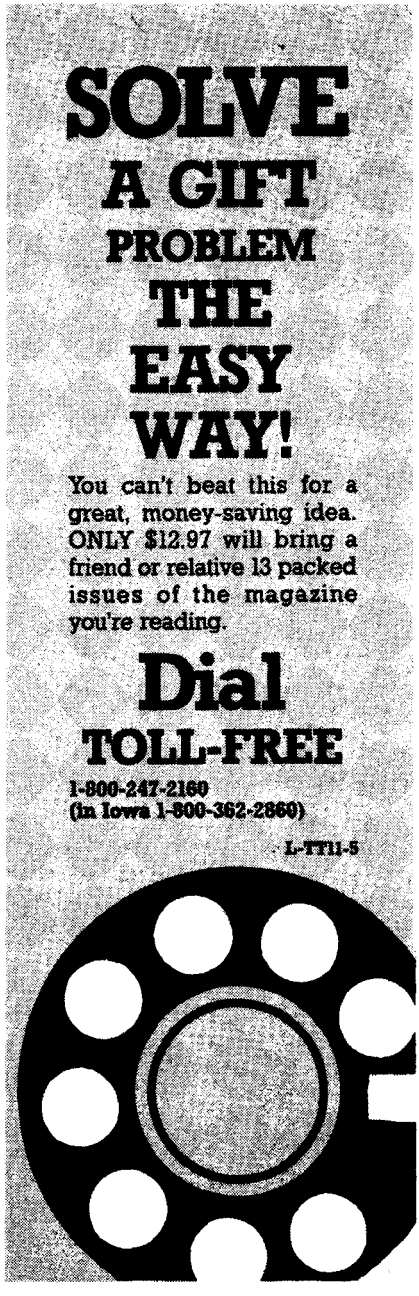
"How many times are we going to hash this out? They're aliens. But they live in our universe, and obey the same laws of nature we do. Maybe some we don't know yet, but at least the ones we do."

"They could have been intelligent species," he said stubbornly. The Galactic Patrol was dying a slow death in his mind.

"All adapted to living in exactly the same environment? Intelligent, yet so devoid of curiosity that they would ignore contact with an alien race or not react to your escape? That doesn't jibe with the beings who built the starship to visit other solar systems. No, Occam's Razor requires my analysis."

"You wield that blade rather freely."

"Suppose *you* were building that starship, darling. How would you maintain it? Thousands of crew members? The problems are as obvious as they are numerous. We use automation, but our ships are small and our flights short—relatively. Why bother when there is a better way—a crew that will work diligently at even monotonous jobs year after year, generation after generation, with very little supervision and no social/economic/political problems."



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"Okay, maybe animals could be gene-altered to instill specific instinctive knowledge. Maybe it could even be made inheritable. But enough so for highly technical jobs?"

"Study up on beehives and termite hills sometime. Individual duties would have to be rather limited, but with all the 'personnel' you need, why not?"

"Because it offends my dignity. If the computer is running the starship and the animals are keeping it operational, then the pink apes were—"

"Janitors. It would explain your treatment. The magnetic monopole must have been a programmed computer response when we moved too close—that's why I felt sure we could leave unmolested."

"But your idea about the cold storage corpses is just speculation—and weak speculation at that."

"Speculation, my microchips. It grows logically from my analysis."

"You wish. If they're the race that built the starship, what happened to them? How could they have all died, and their animals survive?"

"We'll probably never know. Maybe a plague. Maybe they did themselves in. Who knows how long the starship has been travelling, or where it has been."

"So it shows up following some ancient programming, loiters awhile, maybe waiting for orders from its dead crew, then automatically refuels and takes off for its next destination?" He shook his head. "Still sounds like distillate of wishful thinking to me."

"That's because you aren't used to deductive reasoning."

He yawned. "Hell with it. Whatever the reason, we're still alive. That's good enough for me. Better yet, we're going to have plenty of R-and-R time until Kobel arrives. What do you say to that?"

"I say amen." ■

In Times To Come

● As you're no doubt aware by now, we're now publishing an issue every four weeks instead of every month, and that tends to mean that some month of each year will get two issues. This year it's March; our next issue will be dated March 1, 1982. The cover story, "Green-Eyed Lady, Laughing Lady," will be a renewal of an old friendship for some of you and a fascinating new experience, I hope, for all.

A few years ago, a writer named Alison Tellure appeared as if from nowhere and promptly nabbed two of the top spots in one year's An Lab with a pair of stories called "Lord of All It Surveys" and "Skysinger." Creating a truly alien world and characters and making them understandable and sympathetic for human readers is not easy, but she did it. Skysinger returns for this one, along with those "little ones" who shared that world—but be assured that you will not have to have read the earlier stories to enjoy this one. But you *will* have to be prepared to see the world through very different eyes.

My esteemed predecessor, Ben Bova, will make a guest appearance on the Editor's Page, and we'll also have the usual mixed bag of stories and articles—including Part II of Donald Kingsbury's *Courtship Rite.*

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brass tacks

Dear Dr. Schmidt:

Your issue dated Aug. 17 just arrived. "Cyphertone" and "The Big Black Bag" stir memories of similar stories, many years ago. If I had to guess, I'd say *Astounding*, in the '40s or '50s. Padgett? I think it was a group of kids, working together, who step by step became quasi-alien and then disappeared. And the game was not computer-based, but of course that was before THOSE alien things arrived. . . . Seriously, don't those two stories ring a bell with you too? In the case of the garbage reappearing, the resemblance was even closer. What goes on here?

"Thinking of Romance" puzzled me. It started out looking as if the aliens were out to do us dirt. Then the author seems to want us to empathize with them, that they may be causing great pain but "it's all for your own good, eventually." Nuts to you, fellas. If we're going the wrong way, we'll solve it on our own. Which reminds me of Spider Robinson's mention (p. 169) of the "Star Trek" policy of non-interference with alien cultures. I still watch the reruns, and yes, they *talk* of non-interference, but don't practice it! Kirk successfully imposes democracy on several autocratic planets, for which feat he should be hired, in some endochronic way, by our Foreign Service. Or somebody. It just ain't that easy—e.g., a number of small countries here on Earth. And that skirts the question of whether, possessing the ability(?), one SHOULD. I tend myself toward *real* non-interference, here/now and out-there/then. Each culture has a right to go to hell in its own way.

I'm not an anthropologist, but know some. How about those stories where the landing party of supposed cultural experts contains at least one person who recklessly interferes or tries to alter

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some aspect of the local society, although the rest try to persuade him you can't do that unless you understand the total fabric enough to avoid unwanted consequences? Nobody like that would be taken along on an anthrop. trip here on Earth. (Well, I suppose mistakes do get made, but you'd sure be careful if you were sending the team to another planet.) (And in the story, of course the consequences ARE awful.) This smacks of altering reality to fit the plot, to make it interesting.

Stine and Pournelle on getting into space: every time I read their efforts I give thanks for there being such a thing as SF, really. Without it and the people it has stimulated, and the info. network it makes possible, we'd be nowhere near space. Their arguments are (at least to this biased reader) so sharp and clear, it's hard to understand why anyone remains a skeptic. Some oppose—I know them—because of hostility toward industry and capitalism, and they see this as strengthening what they see as evil institutions. The same people are anti-nuclear, distrust scientists, claim not to own TV sets, and sign petitions. Yes, I read magazines like yours for the good fiction, but GREATLY appreciate the other ingredients: reviews, letters, fact articles, space advocacy. Oh, and thanks for your editorial on language! As a college teacher, I see what happens to kids who were persuaded they didn't need standard English. They get here and are drowning. We have remedial classes to help but many drop out of them, too, out of despair and confusion. Damn the people who convinced them to stay with their dialect; they have condemned these kids to failure.

Great issue of a great magazine. Hope you last as long as Campbell did. I started reading him in '39.

RINEHART POTTS

Assistant Professor
Library Science

1223 Glen Terrace
Glassboro, NJ 08028

"The Cyphertone" has a pretty clear spiritual kinship, in flavor and very broad outlines of idea and incident, with Padgett's "Mimsy Were the Borogoves." "The Big Black Bag," for me, had a vaguely Fiftyish "feel," but did not call to mind any particular story. Both seemed to me to do enough that was entirely their own to warrant publication on their own merits. When the volume of a literature gets big enough, and you've seen enough of it, it gets hard to avoid noticing slight similarities here-and there!

Dear Dr. Schmidt,

As a student who has always been able to find more time to read his favorite science-fiction magazine than to read his textbooks, I am very pleased to see the number of stories having their premise in quantum physics increasing just as I am reaching that level in my education.

However, I have noticed an omission in the physics of the story "Schrödinger's Cat" in the May 30, 1981 issue. Although the story makes an excellent use of the Feynman diagram to explain "time travel," it stops short precisely where it is most needed.

Recall that at the end of the story Ion allows the car to approach the quarkonium box, waiting to see if this car will emerge at the other end. It is Ion's plan to contradict whatever results he gets by doing the opposite at his end. That is, if a car comes out of the back end he does not allow his car to enter the forward end; conversely, if no car emerges he will allow his car to enter the forward end.

Now, the Feynman diagram of this

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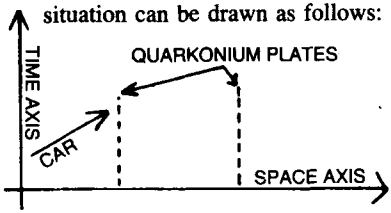
situation can be drawn as follows:



Please remember that as the car "enters" the box it is actually undergoing a mutual annihilation with its antimatter counterpart.

Ion, you will recall, gets into trouble by watching the paradox of a car entering the box when no car has emerged. Actually, following the Feynman diagrams there is no paradox. I offer this alternative ending:

Ion watches as the little Lego car steadily approaches the "time-machine." He watches in an eager dread as the car passes the point where it should already have passed through the back end. He allows it to roll on. Ion trembles a little as the multicolored instrument of his doom inches toward the phase-mirror of the box. Three inches, two, one, and the car gently bumps the solid quarkonium plate, and stops.

A bit wordy, perhaps, but maybe it gets the point across. Without the antimatter counterpart of the car, the car cannot enter the quarkonium box. Without the third car, that is, the time-travelling car that emerges from the back end, there is no anti-matter car, and hence our first car can never enter the box. Hence, there can be no paradox.

If one were to assume that a car did emerge from the back end, and Ion stopped his first car from entering, we have our antimatter car come barreling through the quarkonium plate and annihilating whatever it finds on the outside. But William tried this experiment and no car came out the back side. So we don't have to worry about what we're going to do with that bomb for a while yet.

CARL ROSENE

PO Box 941
Rice University
Houston TX 77001

The author replies . . .

I think Carl Rosene's scenario is impossible. If the machine is working, then there is no reason why a car that reaches the phase mirror would not pass through. By passing through, of course, it produces the necessary antimatter copy (itself moving back in time). As far as I can tell, Mr. Rosene is just hoping that the universe will preserve Ion's sanity by causing the machine to break down at the crucial instant. Keep in mind that it is Ion's explanation of the box, and not William's, that is correct. Since writing "Schrödinger's Cat," I learned of CPT symmetry, which says that any physical process can also take place if one reverses Conjugation (matter-antimatter switch), Parity (mirror-image), and Time (forward-backward). I think it's interesting that once you think about a CT mirror you see that P also has to be involved.

RUDY RUCKER

Dear Editor,

Your prose version of "The Iceworm Cocktail" by Robert Service was very well done, and followed the original ballad in precise detail. But just to keep the record straight, I think you owe it to your readers to mention the original version (which was copyrighted). Your version, "The Iceworm Special," July 20, 1981, just proves again that mankind changes but little, and that well-written stories survive the test of time and are reborn in new clothes. I enjoyed it.

R.S. PETERSON

Nashville, TN

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The author replies. . . .

Dear Mr. Schmidt:

As several readers have pointed out, my story "The Iceworm Special" was based on a poem by Robert Service. Through a mistake on my part, while I was revising an earlier version of the story, the last line was omitted. The concluding paragraph originally was intended to read as follows:

"Oh, the iceworm? That was just a piece of spaghetti that Clancy had colored to look as unpleasant as possible. Just as Robert Service described it, in the Yukon, a hundred and fifty years ago."

My apologies to all Robert Service fans for the omission. What I was trying to do was show that Service's ideas will be just as timely on the next frontier as they were on the last.

JOSEPH P. MARTINO

Dear Stan:

This time it's G. Harry Stine that got me.

A couple of years ago, an acquaintance—one of those disgustingly healthy, energetic, organized, efficient creatures that makes the rest of us look like the slobs we are—started coughing up blood. A week later he was dead, of an unsuspected lung cancer.

The point? That health is not always what it appears to be. And that goes for planets, as well as people.

Yes, it's a big planet. Nothing brings home the utter endlessness of Wisconsin like driving from Minneapolis to Chicago on I-94. I wouldn't dream of walking it, though my great-great-grandmother did.

But I don't think anyone is seriously worried about wrecking the whole ballgame. What we worry about is whether we can keep playing. We humans, that is, in the approximate distribution we now have, with our bellies as well and nutritively filled, our lives as long, our houses warmish and with clothes to confront the climate in.

ITEM: Whole lakes in the northeast are dead. That is to say, nothing much lives in them. Why? Because the rain that feeds them has considerately washed the pollutants out of the air—combustion products we put there. So a few fish are dead, so what? Well, suppose that water were all you had to drink? Would you care then?

ITEM: Under those lush Iowa cornfields the topsoil is vanishing at the rate of a couple of inches a year. By the end of the century some of those farmers will be virtually practicing hydroponics . . . except that

ITEM: The Kansas aquifer, which underlies the central plains, is rapidly drying up. Didn't anyone notice those nice green irrigation circles? Were they there in 1910?

It's a big planet, and a hell of a lot of us are living on it. Forestland in the Amazon basin is disappearing—cut—at the rate of a couple of square miles a day. The Sahara is expanding southward every year. These two things are not unconnected. The haze of smog cuts off sunlight to the Earth. The ocean levels are dropping. These two things are not unconnected. There are other examples—the Freon-ozone business comes to mind, but I'm not an expert on this topic and I don't remember them.

And it's true: Things do look different from the air than from the ground. I live under a flight path and have flown over my house at about 1000 feet several times. Taking a square mile around it, probably nearly 4000 people are my neighbors. From the air, in summer, before the Dutch elm disease hit a few years back, you could scarcely see a roof. But the people were there all the

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same. Maybe you can't see the strip-mining scars over West Virginia—but the acid is running into the streams all the same. And if G. Harry Stine didn't see much evidence of pollution on the eastern seaboard, maybe he wasn't high enough. It sure shows from a jetliner on a clear day. Or maybe he wasn't low enough: I will never forget my astonishment at the clear skies of Minnesota when I first moved here. Blue all the way to the horizon! I thought the top of my head would come off. And I saw the Milky Way for the first time in my adult life, though I often looked at it as a child growing up twenty miles from New York City.

It's a big planet. We can't possibly wreck it all. But while rats, roaches, and brown bears all have the same "right" to be dominant species as we do, I'd still like to stick around a while. I'd like my kids to be able to see this big world, and their kids. So I'd rather try not to mess anything up that I don't have to: the good old-fashioned proverb, better safe than sorry, seems applicable here.

And as far as I'm concerned, its name is *Earth*. That's right, dirt. Dirt is one of the finest things going, the others being fire, air, and water.

LAURIE SPARER

Dear Dr. Schmidt:

I was interested in your editorial of the March 30, 1981 issue, inasmuch as it touched on several ideas which I have been developing. These additional conclusions might also interest you:

(1) Begin with the idea of "productivity"—the real wealth generated per unit of labor. Productivity has been increasing steadily in the rich and advanced countries for the last couple of centuries. It is, in fact, why they are considered rich and advanced.

(2) Productivity has not increased, in the main, because Western laborers work harder or more skillfully than their Third-World counterparts, but because the introduction of machinery has multiplied the effectiveness of that work.

(3) The increase in real wealth has not been uniformly distributed in these societies; often at the time and place of new technology, unemployment has rendered groups poorer. The weaving and spinning craftsmen displaced by textile factories in early nineteenth-century England fought the machines in the belief that they could only steal men's jobs. They were only partly right.

(4) Nineteenth-century classical economists, infatuated by the rapidly expanding economy and generally low unemployment rates, asserted that jobs lost to machines *must* be balanced by the creation of new jobs in an expanding economy. They also were only partly right.

(5) In a system of infinite elasticity in such factors as supply, demand, capital and (above all) natural resources, an economy might automatically expand as fast as productivity increased. In the only world we have, these rates have never quite matched, with the effect that there has been a slow but steady shrinkage of demand for labor (as a ratio to population) since the beginning of the Industrial Revolution.

(6) The difference between man-hours lost and gained throughout the nineteenth century was to a great extent absorbed into a reduction in the average work week. Remembering that 70-90 hours constituted a normal work week in the early 1800s, we should not be surprised that additional leisure time was one of the first products that laborers wished to "buy" with their increased productivity.

(7) The pressure from workers to re-

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duce the working week further decreased during the twentieth century as modern levels were reached; labor unions shifted demands from time reductions to pay increases. The 40-hour week has come to seem "natural" to most Americans since World War II.

(8) The new rigidity of working hours has in turn caused unemployment to drift upward. As an alternative to permitting an open "army of the unemployed" to develop, our society has developed two strategies. The first of these is the creation of artificially high consumer demand to stimulate a "makework" economy: thus we have moved to the planned-obsolescence, resource-intensive, throwaway economy that has begun to collide with resource limits in the last two decades.

(9) Perhaps even more destructive have been the results of the second strategy, that of disguising unemployment by removing groups from the labor market. Teenagers and young adults are taken out of competition by a combination of force and persuasion to keep them in school (perhaps the major reason public schools are falling apart is that they are attempting to educate — involuntarily on the part of school and pupil—groups that no other society in history would have dreamed of putting in an academic setting). Older workers are arbitrarily weeded out by mandatory retirement. Unemployment is made less visible and objectionable to the majority by concentrating it in minority ghettos. In the late '40s and early '50s we even managed to convince women for a while that they preferred to stay in those little dream houses.

(10) A society is a system in which changes in some parts affect all other parts. A generation of experts, specialists, social reformers, and moralists has lectured to us and preached to us without, apparently, having realized that much. More often than not, the "solution" to one problem has turned out to be the origin of another (for example, "solving" the problem of raising women's consciousness, by adding more people to the labor pool, has aggravated the other forms of disguised unemployment). Only when we are prepared to use systematic problem-solving can we hope to solve real-world problems.

(11) What would a "systematic solution" consist of? Your editorial gave some ideas: designing and making products with an eye to energy and resource efficiency rather than considering the preservation of jobs to be primary; shortening the hours of most jobs in order to have enough to go around (the real loss of income in accepting a shorter work week would be surprisingly small—a considerable portion of goods and services is going to those who are unemployed already); teaching Americans how to use leisure time creatively (if everyone responds to more free time by increased long-distance driving or comparable resource-intensive activity, we have a new problem).

(12) What are the prospects that we as a culture will actually try such solutions? If you suspect that Hell will field a hockey team first, you're probably right. Americans instinctively distrust any plan which is systematic as being socialism. The contrast between our abilities to act individually and collectively (including, but not limited to, government) is striking. What other society has ever come so close to the ancient human dream of a world in which labor is not a crushing burden? And what other culture, having achieved this dream, could have so thoroughly turned it into a nightmare?

GARY W. BENNETT

Glenside PA

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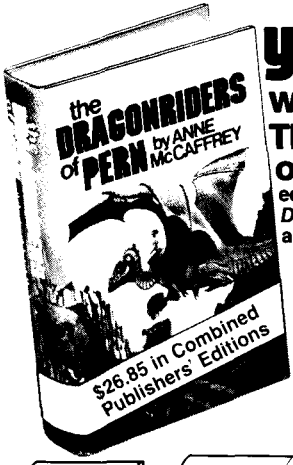

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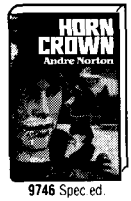

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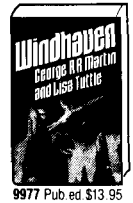

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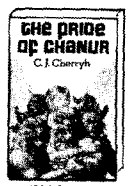

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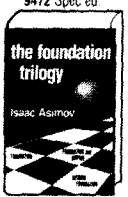

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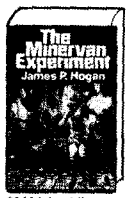

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